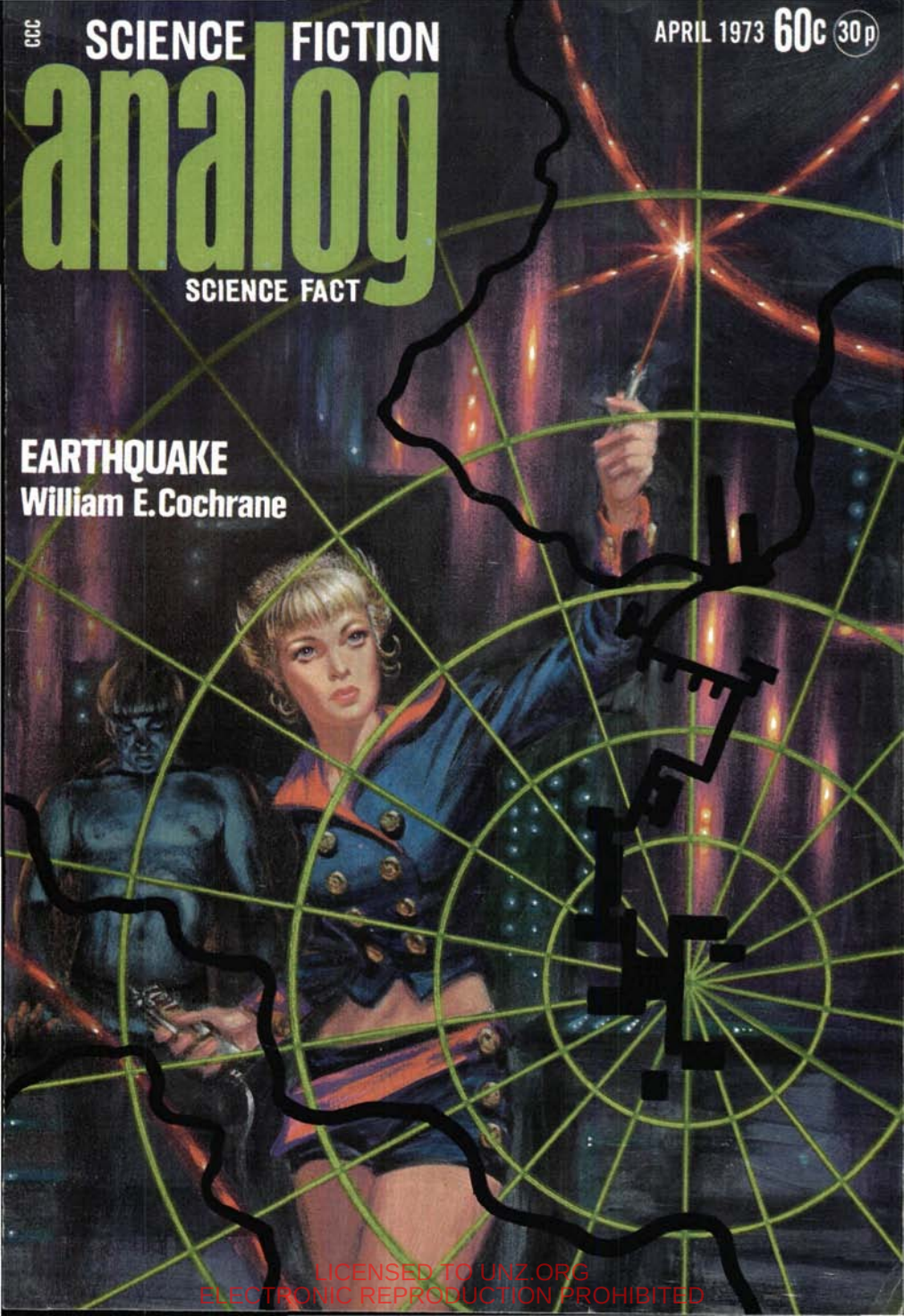

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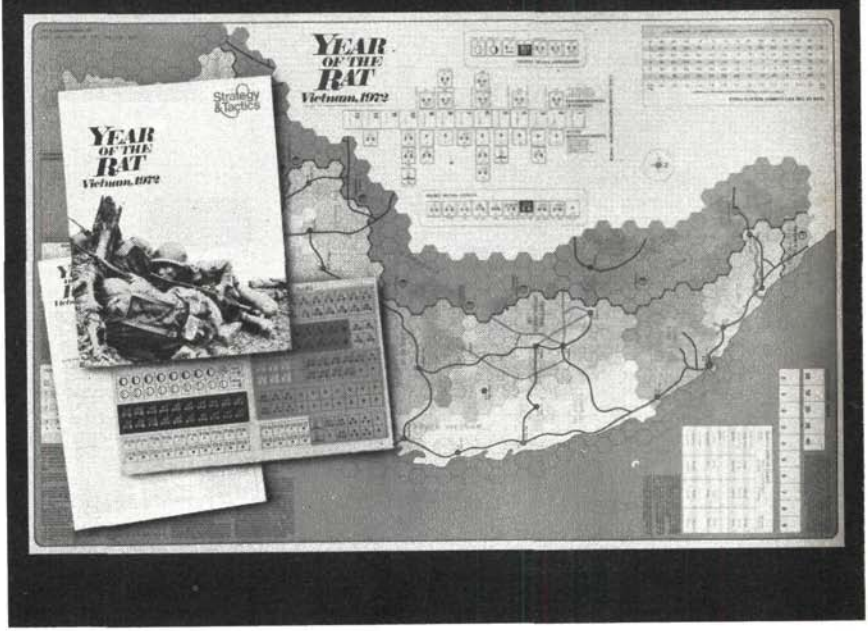
Strategy & Tactics



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BEN BOVA
Editor

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Art Director

ROBERT J. LAPHAM
Business Manager

WILLIAM T. LIPPE
Advertising Sales Manager

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NOVELETTE

EARTHQUAKE, William E. Cochrane 8

SHORT STORIES

MOON ROCKS, Tom Purdom 84
NOT POLLUTED ENOUGH, G. H. Scithers 95
POLIMANDER'S MAN-THING, Pat de Graw 161

SERIAL

THE PEOPLE OF THE WIND, Poul Anderson 110
(Conclusion)

SCIENCE FACT

PARAPHYSICS AND PARAPSYCHOLOGY,
James Benjamin Beal 68

READER'S DEPARTMENTS

THE EDITOR'S PAGE 4
IN TIMES TO COME 109
THE ANALYTICAL LABORATORY 159
THE REFERENCE LIBRARY, P. Schuyler Miller 168
BRASS TACKS 173

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WELFAREFAREWELL

In most science-fiction stories, even those set in the very far future, there's an underlying assumption that people need some sort of work to do, in order to be happy. Jobs are regarded as essential to the economy of the society, even future societies where most or all of the manufacturing is completely automated. Or, increasingly, jobs are regarded as essential to the emotional well-being of the characters. People who are deprived of meaningful work are usually shown as being miserable, dull, listless and generally behaving like someone in a TV commercial before the sponsor's product springs its miraculous cure.

This attitude—that work is good and even necessary—is a reflection of the so-called Protestant Ethic. It's a bit surprising to find that the Protestant Ethic inhabits the thinking of so many science-fiction writers, despite the fact that for three generations there has been a significant and growing number of Americans who have never engaged in "gainful employment."

At heart, the Protestant Ethic says that work is inherently good and man must work if he is to be happy, useful to his community, and pleasing in the sight of God. There is much to recommend this attitude. It helped to make western Europe and the United States the wealthiest and most powerful bloc of nations in the world. In a slightly rewritten form, it's helping to mold Russia and China into prosperous and powerful modern nations.

The Ethic is a reflection of the serious attempts of men to find meaning and significance in the world around them. Early Christianity was the ideal religion for slaves, with its belief that the Second Coming of the Savior was imminent and its conviction that the ways of the world were transitory and meaningless. What did it matter if a man was a slave, when the real prize was heaven, and the world of Rome and slavery was due to end any day now? A cynic might even say that the Roman Empire got more out of its slaves by embracing Christianity than by repressing it. But the slaves *believed,* and accepted centuries of misery, right on down to the time that Rome collapsed, and then even further into the Middle Ages.

In much the same way, people have believed the Protestant Ethic. Often called the Work Ethic, it is a product of the Reformation that began with Martin Luther in the Sixteenth Century. The Protestant Reformation coincided with, and reinforced, the rise of capitalism in Europe. The Work Ethic became a

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form of everyday morality well suited for a God-fearing man who was trying to make the tough and soul-wrenching climb from tradesman to industrialist.

The ascetic messianic faith of early Christianity did not at all suit the struggling burghers of Sixteenth Century Europe. And the assumptions and attitudes of the Protestant Ethic no longer suit a huge and growing number of Americans: the welfare class. For three generations, since the Great Depression of the 1930's, a significant number of Americans have lived most or all of their lives without working at paying jobs. Their number is growing and their problems are getting worse.

Because the Protestant Ethic regards work as good *per se,* working people are treated to praise—words such as "industrious, productive, a real go-getter, a credit to the community." The other side of the coin is much uglier. Obviously, since work is inherently good, people who don't work are inherently no-good. They are lazy, shiftless, cheating good-for-nothings who wallow in the public trough and produce nothing but more babies who, in turn, soak up more welfare money.

These pleasantries are reserved for the lower-class people who don't work. Upper-class people who don't work are called jet-setters. Or, as the philosopher once said, "If you drink in the morning at the neighborhood bar, you're a lush. If you drink in the morning at the country club, you're a sport." The upper class seems immune to the strictures of the Protestant Ethic. The people who take the Ethic most seriously are those who promulgated it in the first place, and disciplined themselves to live by its rule: the middle class.

The 1972 elections showed that the nation's middle class—by far its largest percentage of voters—has developed a hardened attitude toward the welfare class. Essentially, the attitude is, "Why should my taxes be supporting people who don't—and won't—work?" This growing resentment will end our present welfare system very soon. And, although the middle class's anger is wrongly placed and largely based on cruel myths, the real question is not how to save the welfare system; the question is, what will replace the current system?

Before tackling that question, though, let's take a look at some of the realities of the welfare situation. Polls in several major cities have shown that the people who complain about the welfare system

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fall into two categories: the welfare recipients, who don't feel the system does them justice; and the middle-class taxpayers, who foot the bill for the system. The interesting fact, the pollsters learned, is that the complaining taxpayers almost inevitably *have never known anyone who is a welfare recipient.* After all, those poor people don't live in our neighborhood! And they're black!

It's much easier to complain when you don't know the realities of the situation. "Don't bother me with the facts, my mind's made up!" Well, here are some facts. Statistically, the majority of welfare recipients in the United States are whites, not blacks. Most of the recipients are mothers with dependent children; the fathers are nowhere in sight, and the children are too young to allow the mothers to work. The next largest group of recipients are elderly retired persons, again mostly white.

Much hullabaloo has been raised about cheaters on the welfare roles, people who double-park their Cadillacs to run in and collect their unemployment compensation checks. There are some. But very few. And in the same way that every honest cop gets hurt by the discovery of a crooked policeman, millions of mothers and kids and aged people get socked every time some clown gets caught cheating the welfare system. Incidentally, statistics seem to show that there are more cheaters among the welfare administrators than the welfare recipients. There's lots more money to be made in kickbacks from doctors than from bilking the system out of an extra unemployment check.

The biggest problem with the welfare system is that the system *requires* a welfare class, if the system is to survive. Bureaucracies behave like organisms, and every organism tries its damnedest not only to perpetuate itself, but to grow. The welfare bureaucracy is no longer aimed at eliminating or even alleviating poverty; it is aimed at making certain that there are a large number of poor people who need the welfare system. With the best will in the world (perhaps) we've created a system that perpetuates poverty.

Before we all rise in righteous indignation, though, it's necessary to realize that our national economy has probably reached the point where we need large numbers of people who will do nothing but consume the products that our factories produce. We don't need more workers, we have too many workers already! Our work force has been too large since at least the end of the Korean War; the unemployment figures have seldom gone below five percent since the mid-1950's, and they're rising, not falling. And remember, most of the people on welfare are not men temporarily out of jobs: they're

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mothers who can't work, children who've never worked, elderly who are retired. These people aren't even counted in the unemployment statistics!

There are too many workers, and not enough consumers. The situation could get worse as automation continues to take over more and more of our manufacturing industries.

The nation's welfare class represents a group of guaranteed consumers. After all, the only way they can receive welfare money is by proving that they haven't produced any goods or services. The welfare class, however, simply cannot solve the nation's economic woes. You can't expect people on subsistence incomes to consume enough of the nation's goods to make a gain for the over-all economy: not unless somebody repeals the laws of thermodynamics, especially the one about entropy.

So where do we go from here? Is there a cure?

Certainly. It all depends on how much effort and treasure we're willing to expend to produce a solution to the problem. Many proposals have been thrown into the public arena, especially during last year's election campaigns.

One of these proposals has had the benefit of a real field test. And, at first glimpse, it seems to offer some real promise. Both political

continued on page 177

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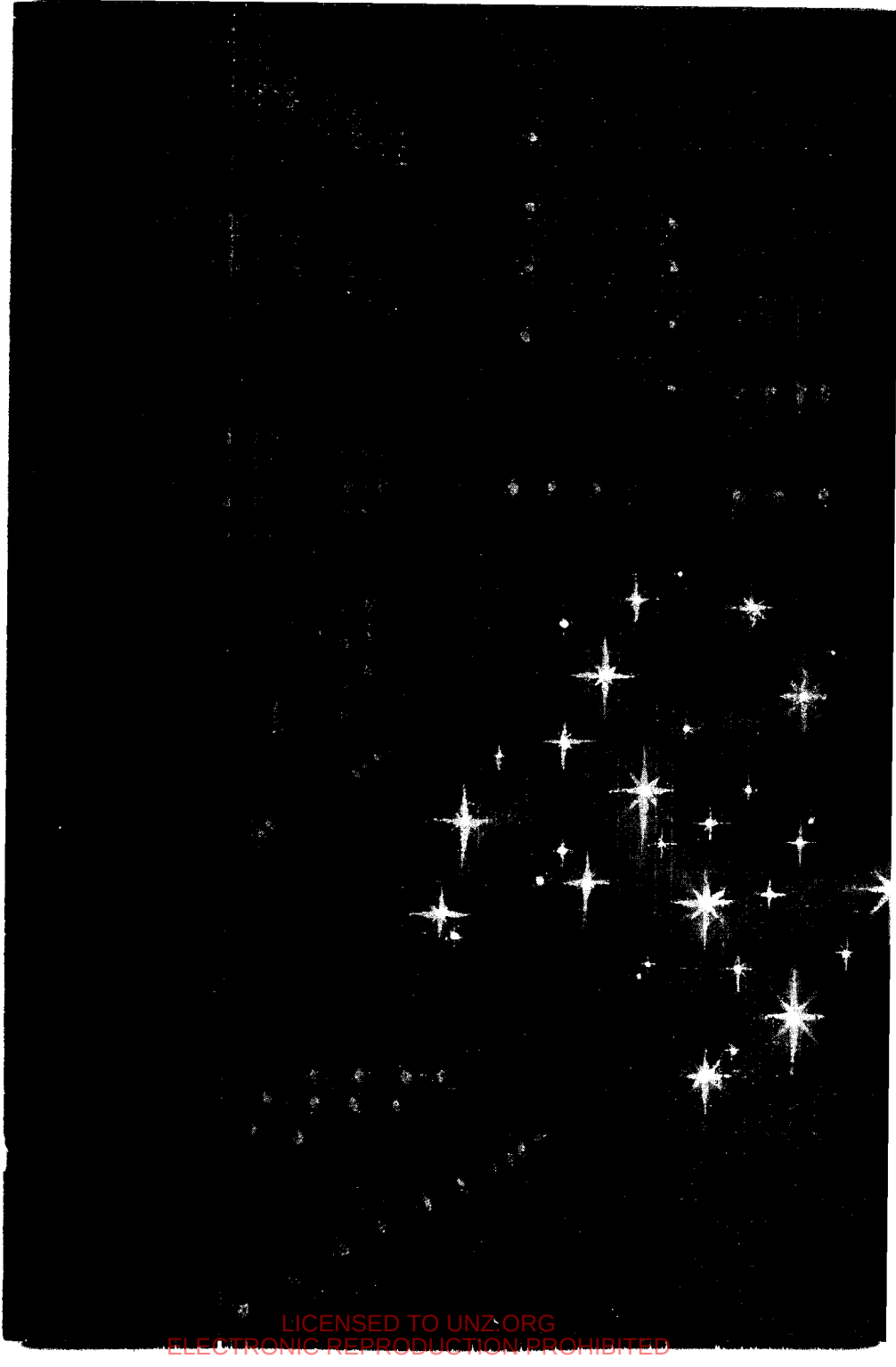

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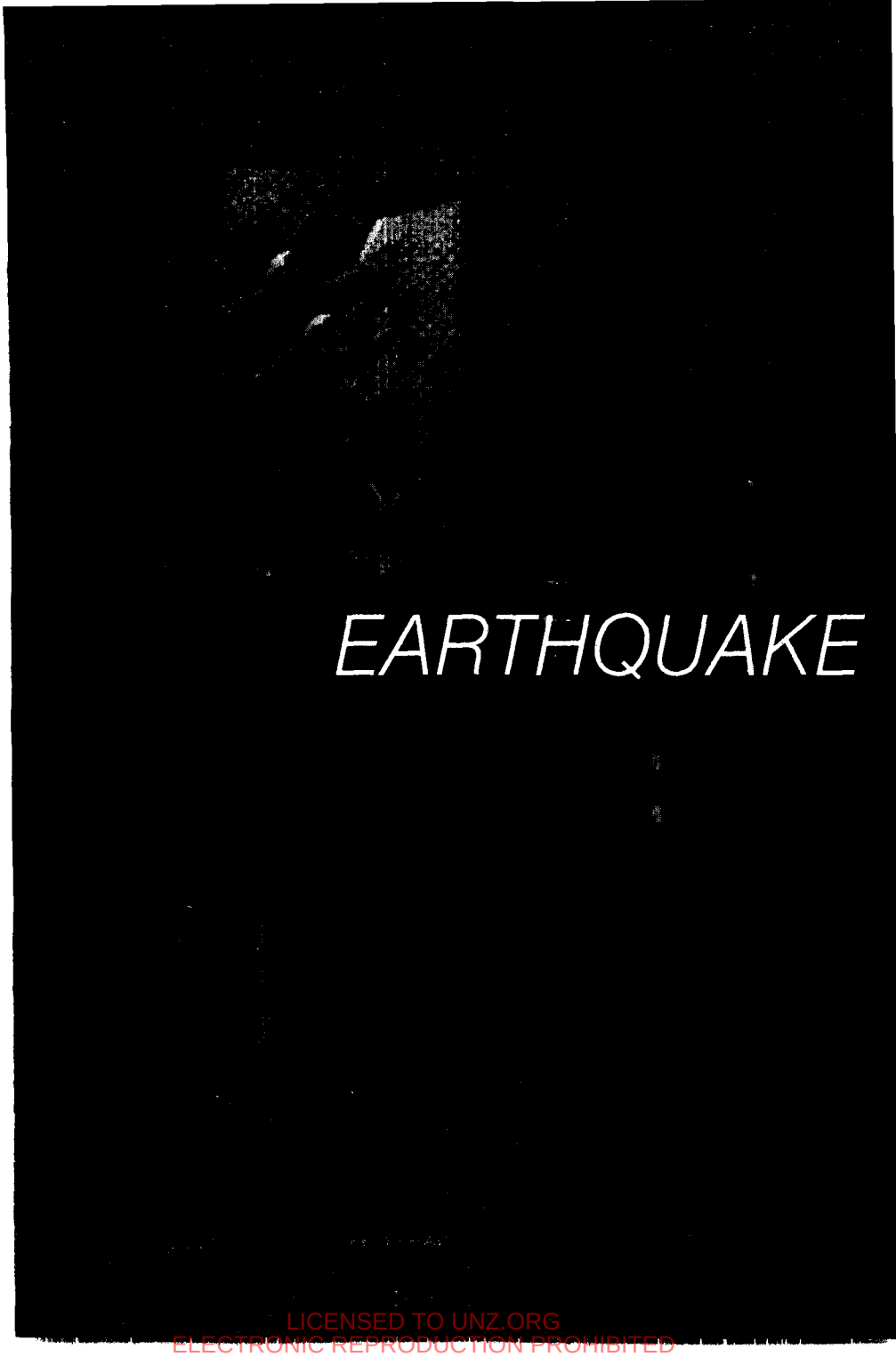

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Predictions can only be based on experience. When there is no hard data to go on, and no prior experience for a guide, how can you predict anything?

WILLIAM E. COCHRANE

"This is surely the strangest earthquake-watching job I've ever heard of." The voice was Lorraine's and it was slightly fuzzy.

Sid Thomas glanced down at the hem of her skirt and the bare leg close beside his in the skimmer cockpit. Her skin was gleaming in the dim instrument lights; lights that softened her small face and turned her hair night-black with gleams.

"How so, Miss DeStamm, ma'am?" he asked and made a course correction on the autopilot. He wasn't drunk, but there had been enough liquor at the party so that the autopilot was steadier than his coordination. "So, how?"

"This is our first job, for one," Julie piped up from the back seat. "We signed on to monitor and predict earthquakes. Instead, we barely get time to see our quarters before you get orders from a general to bring us to a real slushy party. I mean, oh boy. This is nothing—absolutely nothing—like the training manuals. Do you people always stay up so late on Canis IV, Commander?"

"No, Miss McBride . . . Julie . . . we don't. That shindig was a special idea of General Derrick's." Sid frowned to himself. "He thinks stuff like that is harrassing me—keeping me from earthquake monitoring . . ."

"Hey, we're flying out to sea," Julie called out. "I can see the waves. They're all lit up; just like

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me! What is this, a midnight tour?"

"That's right," Sid said cheerfully. "Behind us, ladies and gentlemen," his voice took on a circus cant, "is the mighty mountain scarp of the North Fault. In front of you, also unseen in the mysterious darkness, is the South Fault. These two Faults, ladies and gentlemen, are the father and brother of all earthquakes in this area.

"Di-rect-ly below us, my friends, you can see a moving granite plate. If you watch closely you can see it charging up out of the sea at full speed . . . oh, two or three centimeters a year, easily." He finished weakly and began laughing at his own image. The girls joined him.

"That's the fifty-cent tour," he said, when he had recovered. "Good enough? Actually I'm flying across the twin bays because it is an easier way of navigating back to the bunker. My checkpoint is the center finger peninsula. We turn inland there. We'll be at the bunker a few minutes after that."

"Pretty beach; blue waves." Julie's voice lost a little of its bright edge; became tired for a beat. "Oh, no. You're just taking the long way home to make up for the fact you didn't get to dance with Lorraine . . . or me. Spent the night arguing with the big general. So now, you're flying us home slow, to keep us up late and get even."

"Could be," Sid said laughing. "It's a good idea. But we'll get you both to sleep shortly, I promise."

"No hurry. It was a good party and I'm still glowing," Julie said, "like the waves. Anyway, Arthur has gone to sleep already, I think." Arthur was A. Mendenthall, Sid's oversized laser expert who had appointed himself Julie's protector at the party; hovering over her blond lusciousness like a furry lampshade. He was the other sprawling passenger in the back seat.

"Yep," Julie announced. "His hands have stopped moving. Well, call me when we get there. I'm going to sleep with him."

Lorraine snickered.

Sid raised his eyebrows. He hadn't gotten used to Julie's way of speaking.

"I've only had five minutes with your service files," he said to Lorraine. "Ensign McBride has an impressive specialty and record in gravatic physics . . . very rarefied mathematics, that. But the way she talks . . . sometimes I think EDT operations sent out the wrong girl."

"Wait until Arthur wakes up and finds out what he missed," Lorraine said. "That'll straighten out his mathematics."

"Oh, no. Not you too?"

"It's catching," she laughed.

"What did you mean, 'strangest'," Sid asked, after a moment of silence grew between them. "The party?"

"Partly that I guess, Commander." Lorraine was hesitant.

"Keep it 'Sid'. I answer to that."

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"If you like. Well, I haven't been here long—it's a snap judgment, but . . . Well, General Derrick seemed to be trying to pick a fight with you all night. Is he always like that?"

"No, he was pretty smashed tonight," Sid temporized. "But your intuition was right. He was picking a fight.

"General Derrick considers that I am in his way. He has Contract Articles to build the colony and dock complex and we, Earthquake Detection Telemetry, forced him to put down our bunker and instrument sites first. He did it, with a lot of hollering, and now he acts like we are here on-planet for no other reason than to provide him with service and information.

"He manages to be very petty. The general is like that. But he throws a good party . . . likes his men to relax often. They work harder. How did you like his heavy-handed hospitality?"

"The party?" Lorraine lifted her hands to her hair. The skimmer was open, side wind-screens kept the slipstream out of the cockpit, but the coolness of the night felt good. "Well, it was pretty unexpected, and . . ." She looked sideways at Sid. ". . . pretty masculine."

"And too much booze," Sid agreed. "Well, that's the general again. The bunker is practically dry, so don't worry. I didn't think you were drinking too much . . . Is that what you're worrying about?"

"Oh, no, not that," Lorraine said. "You would be surprised what being the only woman in a room with seventy or so males does to your drinking . . . very sobering." She laughed shortly. "No, I didn't mean the party, or General Derrick, really. It's just being here . . . finally. After all the training. And it's that, down there, I guess." She pointed forward and down at the coastline. The skimmer was flying on a course that took it out over the water, cutting across the two large bays. The waves, rolling ashore, defined the coast in parallel rows of glowing phosphorescence. "Your Canis IV is a little overpowering . . . at night, Commander . . . Sid." She was quiet for a moment, then she said, "It's like looking at a lighted map.

"They called it the *Thomas Site* in the training runs," Lorraine said. "Is that you?" The change of subject wasn't really abrupt. She was remembering the printing on the geological maps they'd given her in training.

"I'm afraid so," Sid admitted. "That is another one of the little things that General Derrick holds against me. He doesn't like to work on projects that aren't his brain children. And then, I'm EDT—under Fleet Command—while he's a civilian contractor. He runs the construction, but he can't run me. Then too, I carry safety responsibility for the colony site, because of

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our quake prediction function, and he thinks that lets me run him." Sid shrugged his shoulders in the dark. "It makes for friction . . . in little ways. The general is like that."

"Oh, he's not a Fleet general, then. I wondered about his rank and his uniform—or lack of it."

"Nope. That is just his idea of a public image. You get into the habit of calling him 'General', though. He's good at it." Sid reached for the controls to turn inland for the Bunker. He'd crossed the center finger of land that was the checkpoint for his navigation.

"It all looks so peaceful and beautiful," Lorraine sighed, referring to the ground below. "You don't think of danger; even earthquake danger."

"Oh, we thought of danger," Sid said. "We are a long way from Earth, and Fleet planning is thorough in that respect." He turned his head up, oriented himself and pointed. "Look!"

Lorraine followed his gaze. "The distorter ship?" she asked.

"Uh-huh," Sid agreed. He was indicating a group of four bright disks, bunched close in the sky, almost at the zenith. The large disk was the distorter ship; the link between Canis IV and the Fleet supply base on Earth. The ship maintained a distorter link, a controlled discontinuity, that connected Canis IV to the Earth-base—twenty thousand light-years through space; zero distance through the link field. When the distorter field was on, there was literally no distance between the ship and the base station.

"The distorter ship; and three lifeboat satellites," he said, his voice taking on a little deeper tone. "One keyed to our EDT snatcher belts and two for General Derrick's crew. He's got a safety chamber on-planet too—for ordinary accidents—but the satellites are our last-resort safety devices.

"All of our instruments, wire, steel, concrete . . . everything it took to build the EDT Bunker and the general's colony and docks, came through the distorter ship's discontinuity," Sid said. "Even pretty ensigns. But if we need help fast, even that link can't get it to us. So we have the snatcher belts and the lifeboat satellites.

"They are a comfort sometimes, up there at night. You can see them until about mid-morning, too. A real comfort sometimes."

Lorraine shivered. She knew the reasons behind snatcher belts, distorter-operated safety devices, and she didn't find them comforting at all.

"What makes the phosphorescence so bright?" she asked, changing the subject. "It glows."

"Food polyps," Sid said. "The water is like a thick soup. Wait a bit! You will never get a better chance to see . . ." He curved the skimmer around in a circle and be-

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gan to climb. "Want to put off getting to sleep for a little?"

"See what?" Lorraine was definitely interested. "You've got me hooked. I'm awake now."

"It's below our horizon, right now," Sid answered. "Look out to sea, while I climb a bit."

"What am I looking for? An island? I don't remember one on the map. Oooh . . . !"

Sid had worked the skimmer up to about three thousand meters and the sight suddenly became visible. He curved toward it, flying out over the bay.

A flowing band of phosphorescence glowed on the sea. It stretched along the coast as far as they could see, running across the tips of the land fingers from northwest to southeast.

"What is it?" Lorraine asked. After her first cry of wonder, the beauty of the flickering blue-green band caused her to whisper. "The water is dancing, like it's alive."

"Fish," Sid said. "A river of migrating fish, five to ten kilometers wide. They swim on the surface and come down from the north to feed in the underwater trench southeast of here."

"Oh, that's right. Our South Fault runs into the sea, doesn't it."

"And a good way out to sea," Sid agreed. "Clear to the edge of the continental shelf. It makes a deep, food-filled trench and supports that massive herd of fish—all year long, as far as we can tell. They never seem to stop. Do you like it?"

"Oh, yes. They're marvelous. The water looks like it's on fire. It's magnificent."

"It's all of that," Sid said. "And that river of fish will be Canis IV's major food supply and export crop for years. The fishermen will come to this colony because of that blue river. They won't worry about the earthquakes at all."

"There will be earthquakes here though," Lorraine said. She had seen the seismological maps of the site.

"Oh, yes." Sid turned the skimmer back inland. "That was inherent in picking this site—the Thomas Site. I am an earthquake specialist, but this colony was sited for fishermen, because of the sea herd. I don't kid myself on that account. The Fleet Planning Board went along with my theory about monitoring and predicting the quake activity . . . I've even got my reputation, and my neck, stuck out to the extent of commanding this first on-planet EDT team. But it is that unlimited sea herd, that glowing river of food, that will bring people into this colony . . . whether I say it's safe or not.

"General Derrick, of course, has a big financial stake in the fishing colony. He tends to discount the danger. He says it won't make any difference to the profits whether we have earthquakes or not. He may be right, I've got to give him that.

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"Fishermen have found fish in dangerous places before this, and lived there for generations. The Timor Shallows on Bysalt II, for example, where the fisherfolk farm the hot water seaweed beds and die when the steam jets blast from the bottom fumeroles; and the Grand Banks, Newfoundland, Earth . . ."

"Newfoundland? Oh, yes. I've seen that," Lorraine said. "We did four days in the orbit lab over there, during senior summer . . . Because of the way the continental shelf forms there, like a river delta of rock, isn't it?"

"Uh-huh," Sid agreed. "And it's a graveyard of fishermen and boats, too. But they still fish it . . . Well, maybe the Thomas Site won't be so notorious. . ."

"You think it's that bad?" Lorraine picked up the note of worry in his voice. "A dangerous site? Because of the earthquake hazard?"

"No, not really," Sid said. "The fault system is almost a classic one . . . easily predictable. I don't know the energy levels of ground transmission, of course. This *is* a new planet, but the first temblor we monitor will give me that data.

"Oh, I expect the Thomas Site will have a quake, all right. But not many. Experience with this type of system says the fault slippage will be well spaced out . . . ten-year periodicity . . . maybe thirty years, for a good long lull."

Sid let his voice trail off, then cleared his throat. "I didn't intend to talk business tonight," he apologized. "Especially not so late." He laughed softly. "You know, there are about a hundred and fifty guys on this site that will try to take you out to see that river of fish in the dark; and they won't talk shop."

"I'll tell them the skipper already showed me," Lorraine said. Her laugh was a delight. "That will put them off . . . and boost your reputation."

"No need of that," Sid chuckled. "What reputation? Fleet has ruined everybody in the Bunker, just posting you two girls here. The general probably thinks I'm—"

"Bunker One to EDT skimmer!" The dash speaker cut into his sentence. *"Emergency call! Come in please. Bunker One to . . ."*

Sid caught up the hand mike and switched the transceiver to XMIT. *Bunker One* was Daniel Ames, on duty with the seismographs at the EDT Bunker. His emergency could be an earthquake.

"EDT skimmer to Bunker One," Sid called. "Acknowledging. What is your emergency, Dan? A quake? Listening out."

"Negative on the quake, Skipper," Dan's voice crackled. *"But there is an accident at Site Four—the docks. Injury. The general's HQ said to contact you. They want the skimmer down there for an ambulance. You are in the air and closest."*

"And General Derrick needs me as an errand boy again," Sid said into a dead mike. Then he

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thumbed the switch and went on: "O.K., tell them I will cover it. I'll have to come into the bunker and let off my passengers first. I've got a full boat. Have a stretcher outside waiting for me, Dan. I'm over you now, coming down. Skimmer out."

He tipped the skimmer around in a flat spiral and dropped it fast.

"Wake them up back there, Lorraine," he ordered. "The party's over. Ah, there. The pad lights came on." He took the skimmer into the ground.

"Julie!" Lorraine yelled. "Wake up. Quick. Flash Red!"

Julie came awake and gasped as she felt the skimmer falling, but Sid landed before she had time to get scared. She was awake though, shocked and sober—neither of the girls had done much drinking.

"There has been an accident, Julie. The skipper needs us out of the skimmer," Lorraine explained, throwing off her seat straps. "Get Arthur awake and moving."

Julie nodded, pushed at Arthur's inert body, with no result. He was still out.

Sid saw Dan Ames lugging the stretcher out of the Bunker and ejected the side wind-screens, letting them fall to the pad. "Move it, Ensign!" he ordered briskly, all informality turned off like a light. "The stretcher goes where you're sitting."

Julie looked up, and took in the approaching stretcher. She stopped trying to shake Arthur, leaned over him and kissed him full on the mouth. Then she lifted her head a bare inch and screamed. Loud. Piercing.

Arthur's eyes flew open. He registered Julie's face, the kiss, her scream . . . and his reflexes took over. He unsnapped his seat belt and ran.

Julie jumped out and joined Lorraine on the ground. The whole operation had taken a flat five seconds and she looked a little pleased with herself.

Dan Ames slammed the stretcher across the back seat and Sid stood up to reach the hold-down clamps on his side of the cockpit. His shoulders were shaking with silent laughter.

"Can't we help at the accident?" Lorraine asked. Her voice was controlled, but she was also close to laughing.

"No thanks," Sid said, sliding back into his seat. "You get some sleep. This may take the rest of the night. I'll see you later on, when you get up . . . about noon. Good night, both of you. Now, stand clear!"

Riding empty, the skimmer punched a hole in the sky, dragging a rolling thunder behind it. In minutes, Sid had the lights of the Site Four docks below him and was racking the skimmer around in a circle to lose altitude. The loca-

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tion of the accident was very evident. One of the concrete-mixing Dewars was tilted out of line with a skip loader trapped under the support frame.

Sid took the skimmer down into the lights.

Two of the work crew broke away from the organized confusion around the skip loader and came over to unship the stretcher Sid carried. Sid followed them back to the accident without giving way to his desire to ask what happened.

"Hi, Sid," Ramierez greeted him. Ramierez was General Bat Derrick's operations boss: a short, western-hemisphere, Spanish type. His usual veneer of polished neatness was rumpled and the leg of his coverall had a smear of bright red blood on it from hip to knee. "Ah, Sid, this is a bad one." He was trying to straighten his dark hair with a dirt-covered hand. His eyes were bright, tired, but shining with adrenaline stimulation. "They are still cutting him out of the loader cab. I'm glad you could get the skimmer here. I don't think he would survive the truck trip to Site Two."

"Why didn't he pull the panic ring," Sid wondered. "His belt would have jerked him out. Nobody could tag a 'bug out' on him, with *that* coming down on top of him. Coward or not, he wouldn't be broken up . . ." Sid let his voice trail off. "For that matter, why is he still here? He should have passed the critical limits for his snatcher belt . . ." The construction snatcher belts were set to transfer a wearer back to the rescue chamber at Site Two. The safety limits of pain, shock, and blood pressure should have been exceeded long ago. But they were still cutting the man out of the wreckage . . .

"Ramierez, you are working without belts again," he said. "Good God, you know better, even if General Bat doesn't seem to. Night work too . . . What were you doing? Swinging that Dewar? Eight thousand kilos; and wild mass, too. God! No belts! How could you be so stupid?"

"There were belts, Sid." Ramierez was tired; he didn't react to Sid's anger. "Of course there were belts, but this one did not work. There are not enough belts, of course. We use only five—for hazard jobs—so even this work . . ." He gestured around him; they were beside the skip loader cab now, among the workers trying to free the trapped man. "Even this work is not safe. But it must be done."

The laser cut off and somebody shouted: "That's got it! Ease him out!"

Hands helped lower the limp body into the stretcher.

"Get him back!" Ramierez snapped. "To the skimmer! Everybody get back out of this. Behind the ropes. Luis! Morgan! Come out of there, fast!" This last was to the

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two rescuers in the wrecked cab.

"Come on, you timberjacks! Eddie, get this thing stabilized. Back to work. The show's over!" He moved away, directing material in to bolster the tipped Dewar.

Sid followed the stretcher back to the skimmer where an aidman had it grounded while he worked on the bleeding and strapped on some narco-spray nerve blocks. There was a lot of blood, the injuries were messy, probably serious: that hip bone had to be shattered. The man himself was mercifully unconscious, but alive.

Sid had seen blood before. What he *was* interested in was the snatcher belt that didn't work.

He caught a glimpse of it as the aidman opened the victim's jumper. The sight and the color of the belt jogged him into instant alertness. He bent over, shouldered his way next to the medic, and said: "Give me his safety belt!" in a flat order.

The aidman squeezed two narco buttons on a nerve block strap he'd fitted to the man's arm, then unbuckled the snatcher belt and held it up over his shoulder, absently. He went back to his clean-up work as soon as Sid took the belt from him.

"O.K., break it up! Find things to do!" Ramierez pushed into the crowd around the stretcher. "This shift has four more hours to run. Go earn your bonus, you millionaires." He turned men around and shoved them back toward the job.

"Ramierez," Sid said, "come here a minute, please." He had backed away with his prize, the belt, and was leaning against the skimmer.

"Sure, Sid," Ramierez answered. "What do you need?"

"Is General Derrick coming down?" Sid asked, still trying to get his thoughts straight. He was fingering the belt, checking the power supply leads.

"No, Sid, he's not. The general is, how do you say it—out of it . . . for the night, at least. You were at the party, weren't you? No, we will put a report of this accident on his morning report, but not tonight. That is why I am working on the night shift. The general doesn't help when he's . . . and he knows it, Sid my friend.

"What is that you have? Oh, a snatcher belt." Ramierez broke off because of the way Sid was looking at the belt. Sid might look at a snake with the same expression.

"Barney's huh?" Ramierez prodded, trying to find out what was wrong. Barney was the man on the stretcher.

"Ramierez," Sid's voice was shaky with emotion, "it's a good thing he didn't try to pull the panic ring. He would have ended up in our EDT lifeboat: out in orbit. With his injuries and the satellites powered down, he might have died before the alarms got a rescue boat out to him."

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"Lifeboat?" Ramierez was bewildered.

"This is an EDT belt. It's keyed to our satellite lifeboat," Sid repeated. "The panic ring would have jerked him out there, not back to Site Two.

"An EDT belt, Ramierez. Somebody must have stolen it from the bunker. This is an EDT snatcher belt; out of the locker in my bunker. See the nameplate."

"I see it, but what does that prove?" Ramierez shrugged. "The belts are all Fleet issue. They are emergency safety devices, not personal property. Who could steal one?"

" 'EDT belts are designed to provide escape for technicians who may be observing earthquake phenomena up to and including terminal building damage, ground fractures and volcanic activity,' " Sid said in a singsong quote. "My crew plans to stay here, on the colony site, through an active earthquake. We may get a temblor big enough to wreck your buildings. With that in mind, Ramierez, can't you see? Our EDT belts are set for those stresses . . ."

"You mean . . . the belt didn't work . . ." Ramierez let his voice run down again. The realization of the stresses the belt was set to accept, before it performed its snatching function, built up in his mind. "Holy Mother . . . !"

"Yeah," Sid agreed. "That cab was just crushing him slowly. No shock waves, no violent accelerations . . . EDT belts are set to much higher tolerances. Whoever gave him that belt might just as well have murdered him. If the accident had caught his head or chest, it would have been murder.

"Also, if it *had* worked, the belt would have jumped him to our EDT satellite; up there. Who would have looked for him there, huh?"

"He's strapped in, Commander," one of the workmen called.

"Pierce, you go with him," Ramierez shouted to the aidman. "Take your kit." Pierce nodded and slid into the skimmer beside the blanket-covered stretcher.

Ramierez turned back to Sid. "If what you say is true, you take the belt, huh? You take that belt back to your bunker." He shuddered. "I don't want it around here. I want it caged up like a snake."

"Right! And you find out who stole it." Sid slid in behind the controls. "You better check your stock and see if any more of these are loose. I'll count our bins when I get back."

"Take my man in, Sid," Ramierez said. "Get out of here fast. I will hunt my snakes. You fly that thing!"

Sid nodded and took the skimmer up and headed northwest, to Site Two, Derrick's headquarters. He kept the skimmer low, flying parallel to the main road, to save time with his injured passenger.

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There was no time for sightseeing along the coastline this time, but the irony of the trip was not lost on him. He *was* flying back toward the party, but for a drastically different reason. One way or another, General Derrick had managed to ruin the evening.

The valley and the colony town were still in early morning darkness when a sensitive instrument emplaced on the hills changed its position. Six minutes later the time-sharing telemetry net sampled the data from this instrument, compared it with the others placed in the valley and began to input data directly into its T367 computer station.

At the same time, the telemetry link stepped up its sampling rate and closed an alarm signal in the barracks section of the EDT bunker. The alarm was part of the computer's programmed instructions to put a human operator into the data link at this point.

The Earthquake Detection Telemetry system on Canis IV had exhausted its ability for action: except in an emergency and with human help. The data indicated the emergency; the alarm output called for the help.

Dan Ames was sacked out in the duty bunk, so the alarm woke him up. He came awake alertly and swung his feet onto the floor. The floor was steady. He hadn't had enough sleep to make him groggy, affect his sense of balance. If the floor felt steady, it was steady . . . what else? There wasn't anything in the small room that could give him a swing indication . . .

He thought back over his dreaming. It had been about the newly arrived blond, EDT Technical Ensign Julie, and martini drinking . . . The alarm hadn't been triggered by a temblor, then. Or if it had, the shock was so short . . .

Nuts! There was no use second-guessing. His mind kept up its silent monologue as he stepped into his boots. He slept in his pants, but he didn't take time for his shirt or socks. The bunker had instruments to tell him exactly what had happened. He wouldn't have slept through anything stronger than a 3.5 quake anyway. Also, the effects of anything stronger would still be going on . . .

Dan went down the hall and through the door ports to the instrument room.

The alarm lights were lit on the tilt meter panels. He scanned the telltale panel for the laser grid. The lights there were all green.

Well, not too bad, he thought. Something was moving, but no fault slippage had registered yet. He went over to the computer in front of the instrument bay. He keyed in the program code for the tilt meters and the instructions:

WRITE ORIG.
ALARM UPDATE.
DISPLAY ESTW.

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The computer began to trace curves on its display console that were stylized cross sections of hills and the valley floor at each of the tilt meter locations. The computer program took the tilt meter telemetry input and used it to show the change in the valley cross section that would produce that particular reading.

Dan watched two of the UPDATE displays from the time-sharing samples, then he picked up the hot phone. The rest of the EDT team was asleep in the detached living-quarters building. The hot phone went to Commander Sid Thomas's room. Picking it up was a routine gesture and Dan put it right back in the cradle. He remembered; Sid was out of the bunker on a flight.

He hung up the phone and went back to prowling the ranked banks of instruments. Nothing was registering with enough importance to feed into the computer, except the tilt program.

The microseism plotter caught his eye. The trace on the drum grew wider and thicker as the needle recorded tiny ground quakes—less than .5 intensity. For a moment he tensed, then relaxed. The pattern on the drum had a familiar shape. It didn't record the beginning of a large temblor, the pattern was the microquake that the instrument recorded whenever the skimmer landed or took off. Sid Thomas was back.

Sure enough, the door slid open and Sid came in. He was rumpled and tired and holding a snatcher belt in both hands. His expression changed from tired worry to a one-eyebrow-up query as he noticed Dan's concentration on the instruments. He looked quickly at the alarm panel, but the lack of red lights only increased his puzzlement.

"What have you got, Dan?" he asked, and located the one red alarm light at the same instant.

"Better wake up the troops, Skipper," Dan said. "I have a tilt alarm, as of ten minutes ago." He pointed to the cross section display, then crossed over to the seismograph drums and peered into their recording surfaces. "Nothing on the seismographs. But the tilt is building up."

"I see." Sid was standing before the computer console, watching the traces develop.

"Do you know the status of our snatcher belts, Dan?" he asked with apparent irrelevance. "Stock levels?"

"Why yes, I think so." Dan was puzzled by the question, but he had just checked in the equipment for the two new girl techs. He'd been in the belt storage bins as a matter of course. "But it's just a tilt, Sid. I don't think it will be a belt situation for some time. Do you?" Sid didn't answer, so Dan, remembering, gave him a stock count. "The two girls brought their

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own belts—set for their female heartbeat, physiology and pain tolerances. I racked them in the emergency locker along with ours. They brought one spare each, per regulations. I put these in the safety bin in Stores Five. There were six there; still packaged . . . no—five. I remember the hole. Five and two . . . seven in storage; five in the emergency cabinet; that's twelve plus the one you're holding . . . thirteen. That counts right: something wrong?"

"Yeah," Sid took the belt he was holding and opened the bunker safe. "This belt was on that accident victim at Site Four."

"You mean he got snatched out to the lifeboat satellite?" Dan asked.

"It didn't snatch him anywhere," Sid snapped. "Think, Dan! How could I have the belt if he . . . The belt is set for earthquakes. Force 9 earthquakes. Not for industrial accidents. Damn near killed him." Sid shook himself like a wet dog.

"I'll look into that later," he said, taking a deep breath and closing the safe. "Meanwhile, let's take care of EDT business. This tilt look like something interesting to you, does it?" He put his hand on the intercom switch to the sleeping quarters.

"You bet it does, Sid," Dan said, rubbing his hands together, all thought of snatcher belts cleaned from his mind. "This is just what we came here for, Skipper. If this is starting off with tilt indications in the basalt sheet, it's proving out your theory. The quake will be a nice normal one with all the symptoms and we've got it instrumented within an inch of its life. It couldn't be better. Ring up all hands on deck, Sid! I think we are going to have Canis IV's first predicted earthquake."

"I think so too," Sid said. "We've been waiting for it long enough." He pushed the alarm switch to wake up the rest of the team.

Arthur Mendenthall bumped his way into the instrument room, hitting both sides of the door hatch. He was still half asleep and trying to get his left boot on, as he moved. He ducked his head instinctively to avoid the top of the hatch—Arthur was tall enough to make that a habit—and the duck threw him off balance. He missed putting his foot in the boot, hopped into the room on one foot and sat down backwards. He spun around to scan the alarm lights. They were still green, so he grunted: "I didn't feel the quake. Where was the epicenter?" And put his foot into his boot in disgust. He thought he'd missed a short temblor: missed the whole thing.

"Get off your butt and check your beams, Art," Sid said. "You haven't missed anything." He pointed at the writing console in front of him. "Our tilt meters are

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recording, but nothing shows on your laser panels yet." Sid waved him toward the indicator panels. "Check your beams for collimating. Nothing shows now, I expect, but there ought to be some creep pretty soon."

Arthur grunted happily and edged his way through the recorders to his consoles.

Sid had been reading the individual scope curves as they appeared. He thought that there were enough for the computer to handle. "Let me see the grid display, will you, Dan?"

Dan nodded and typed in: DISPLAY NORSO.

The computer began writing curves for the tilt meters that were facing up and down the valley. These showed up as short, near vertical, lines crossing the curves already displayed.

"Dan, I want you to run a test of every snatcher belt we have in the bunker," Sid said abruptly. "Just as soon as you get a break in this. Test the one in the safe, too. I'll open it for you."

"What? Huh?" Sid's change of thought took Dan by surprise. "Sure, if you want it, Skipper. But my tester just runs a standard continuity check, you know." His mind was digesting the implications of Sid's request. "I haven't got any way of stressing the belts to actually check their tolerance settings. That is a Third Echelon maintenance–Fleet Base . . ."

Dan shivered a little. The chill wasn't all because of his lack of clothes. "Sid, you've got me worried. Maybe we'd better plan to get a boat down here to take us off. I mean with the girls and all . . . Let's scrap your plan to stay here through the quake–just for the first one anyway. We would get data from the instruments and there will be other times."

"Don't make a big thing out of it, Dan," Sid said. "There's too much work sunk into this bunker to abandon our planned stay. I don't expect to need those belts. All I want is a safety check of a piece of equipment. A simple check. Don't build it into something it isn't. Understand me?" Sid's voice took on a stern tone he rarely used.

"Sure, Skipper," Dan said. "I'll test them. At the first break." He wasn't really sure why he felt squeamish, he'd been training and planning for this job and he knew as much about the bunker's design as Sid, but there was a feeling, a tension . . . He shrugged and went back to the tilt program.

"The computer's got enough grids now," he said. "Here's the picture." Dan had waited until about ten of the vertical lines had appeared, then he typed an operation code and an expanded scale factor.

The screen display turned a little and the curves separated, appearing

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to take on a perspective illusion. Now they were displayed as a three-dimensional view of the valley. A view drawn by the east-west cross section lines and the north-south grid lines.

"The whole northeast end of the valley is coming up," Dan said. "That's what set off the tilt alarm, for sure."

"No beam slippage." Arthur reported. "But the collimator circuits all along the North Fault are drawing current. That's a data check. The laser beams are being adjusted downward to stay in register. It must be a slow movement." His rumbling voice was gleeful. His instruments were working, showing the earth movements they had been designed to register. "Slow movement," he repeated. "However, movement we do have: and all very suddenly. Your alarm was right on the money, Dan. I would say we are going to have an earthquake—very, very definitely."

He turned to look at the display console and stopped, staring at the doorway. He grunted happily.

"The rest of our team has arrived," he announced. "Sid, you really must post the regulations requiring all station personnel to answer emergency calls without stopping to put their shirts on." He pounded his hairy chest. "Traditions of the service."

"I didn't consider we were station personnel, yet," a cool female voice answered him. It was Lorraine, the brunette Technical Ensign. "Although you keep such a short night-sleep schedule around here I'm not sure whether we are on duty or not." She stepped aside to let her partner Julie come into the bunker.

Julie said, "That's right. What day is it? My orders say I don't get personnel until Monday."

Dan began coughing.

"I really admire your . . . traditions, gentlemen," Lorraine said, looking pointedly at Dan, who hadn't bothered to put on a shirt yet, either. "However, I think you will find that the regulations call for Class C uniforms, even for emergencies. Although I admit, 'Undress tropics' is an unfortunate choice of words." She wasn't being stuffy, in fact she was trying hard not to laugh. The men had been at their humorous best at the reception party last night . . . There had been a lot of sex-based, me-Tarzan-you-Jane, viva-la-difference humor bandied about last night and Lorraine was trying to revive the mood. That sort of stuff was good for relieving tensions, and she had some tensions of her own to relieve. As a good seismologist, trained on an EDT Bunker simulator, she knew how to interpret the red light on the warning panel and the way the men had been tensed before the recorders when she walked in.

"She's right, Arthur. Right she is," Dan said. "You'd best read up

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on your regulations. Besides, you can see that the ladies hurried to answer the call. Miss McBride's blond hair is somewhat uncombed and she is not completely dressed. She's not wearing her . . ."

"A gentleman wouldn't notice," Arthur bandied. "A sneaky gentleman would notice and never tell."

". . . wearing her boots," Dan finished, smugly.

Julie McBride put one hand to the top button of her straining blouse and a glowing blush declared that she had indeed hurried her dressing.

"The call was supposed to be an 'all hands'," Lorraine cut in. "Do you want to put us to work?"

"Yes. Is there an emergency or not?" Julie asked "Do we go back to bed or take off our shirts?"

"The first man who answers that gets cited for not watching the instruments!" Sid Thomas cut in. He was laughing. Julie McBride was a top graduate, specializing in gravatic physics, but she had a passion for dumb-blond sentences. The party last night had been almost a one-girl comedy routine.

"We certainly can use you . . . put you to work," he went on, trying to get things back to business. "Miss McBride, we appear to be getting a very widespread tipping effect . . . apparently of the whole crustal section, locally. You ought to check out your gravity detector. The system is complete—the disk was mounted and instrumented a week ago. We performed the instrument checks according to specifications—they were all green. I understand that those specs were set up according to your senior study program.

"Well, I mean that hunk of aluminum ought to be reacting more than somewhat under these conditions, if I read your graduate reports correctly, don't you think?" Sid smiled as he noticed Julie's increasing interest.

"Oh, my yes, that should be . . . oh, very interesting." Julie almost quivered with excitement. "How do I get to the detector installation, Commander?"

"It's in a separate building, fifty meters north . . . No need to go out there, however, your sensors were all remoted into this bunker . . . that panel over there. You'd better see if they are giving you any good data. The calibration charts are all there." He ran his hand tiredly through his hair. "I think that if you concentrate on your detector it will be more valuable than helping with the standard instruments in here. Don't you agree?"

"Whoa, Chief!" Arthur said. "Stop her. If she says, 'Measurements are my business,' like last night, we won't get any work done."

Julie laughed and went over to her panels to begin consulting

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them. Her blue fuzzy slippers gave her a delightfully unprofessional look.

"Lorraine," Sid went on. "Will you start setting up the inside cameras, please. Judging from the time we have spent in desultory conversation without anything interesting happening, it appears as if our earthquake isn't going to happen right away. So, I'd like to get a backup data system going. The cameras are all in place. They need film cassettes and you should set them for one-minute time-lapse shooting. Also set up a log for changing cassettes, in case this stretches out. Will you do that, please?"

Sid rubbed his neck and rolled his shoulders tiredly. "I won't have time for a guided tour of the bunker just now. However, our layout here is the same as the simulator at the Academy. You shouldn't have any trouble finding things. The job of loading the cameras will let you see all of our equipment, on your own, in the fastest possible time. Does that sound all right to you?"

"Surely, Commander. You won't want us actually monitoring your equipment while you are trying to work out a prediction. Julie and I have trained on a simulator station like this, but you three have spent a year setting up the equipment. You can work it more efficiently by yourselves. I understand; don't give it another thought."

"Don't flatter yourself, Miss DeStamm," Sid bristled. "I am going to assume that your training qualifies you in every way. The informality I maintain on this station is not meant for an R&R assignment. You are on duty, as of now. Your training status stopped when that alarm bell rang, this morning. I don't intend that film job as makework. There will be plenty of real work for all of us, you and Miss McBride included, but right now, I need you to fill cameras. If somebody else needs a hand, it won't be because he wants to hold it in the moonlight—Canis IV doesn't have a moon—it will be because he needs a seismologist. So, jump to it when you are called, Ensign."

"Aye, aye, sir."

"Dan, what have you got plotted?" Sid turned to the display screen.

"Normal to tilt: plan view, Skipper," Dan answered. "Here's the map overlay." He punched MAP-OVER, then let out a whistle when he saw the display.

The screen had been filled with a rainstorm pattern of short arrows displaying the direction and angle of tilt of the ground around the station. Now it was obvious on the map that the arrows were centered on the colony town site location, just eighty kilometers away, to the south.

Dan put a plastic straightedge on the screen and ran two or three of the arrows out to check for convergence, lit up the point with a

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light pencil, and instructed the computer to verify the area of convergence.

All but six of the arrows blinked out. They didn't converge; the rest did.

"It's going to be right under Sites One and Two. Just at the north end of construction," Dan said. "The whole section of crust between our two local faults is tilting toward the bay—and the pressure is still building. Arthur, do you get any foreshocks that we might have slept through?"

Arthur had been checking the seismograph rolls.

"Nothing at all," he reported. "The microseism recorder is full of hash, though. All three stations in that net are showing tracings. The local ones too. Who had the skimmer out?" Arthur recognized the little flier's signature.

"The skipper," Dan said. "He was out helping General Derrick . . . being an ambulance driver. The close-in stuff won't mean much," he mused, tapping his teeth with the light pencil. "But the rest of the activity is good data. We could sort it out. Think it means enough yet, Sid?"

"Probably not yet. That kind of activity is to be expected with this tilting going on," Sid said. "That tape probably shows the five of us running around in here, too. It's sensitive enough."

"You want to tie up the computer with the microseism program now?" Arthur asked. "Or wait for something bigger to happen?"

Sid considered. The answer was a matter of time and priorities on the equipment in the bunker.

The microseisms, hundreds of tiny earthquake waves coming from the crust strains, could help predict the location and force of the major quake. By timing the arrival of a single wave at each of three seismograph stations, a circle could be drawn through the origin of the microquake—three intersecting circles, one from each station, and the location was pinpointed.

The trouble was with the microquakes, themselves. There were hundreds of them an hour; coming from everywhere. They were caused by wrinkling and resistance in the crust to the pressure that would produce the major earthquake. Measuring the waves at each of three stations—you had to be sure you had the right wave—calculating the radius and intersection point, was a job the computer was programmed to handle. The number of microquakes, the number of operations involved, loaded the computer's capacity seriously.

"Can you put a number to the tilt movement, Dan?" Sid asked. "Any guess as to our time?"

"The build-up was fast, Chief." Dan had anticipated the question. "And it is still moving. One of our two faults is going to give way,

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pretty fast. Any time between now and ten days, by the math.

"Sorry to be so vague, but the only tilt figures the library tapes have under this rate are from Hawaii Museum on Earth and Vulcanii Laboratory V, out in S Doradus system. Those both record volcano action with lots of foreshock activity—doesn't apply here."

"Milne transforms?" Sid referred to the classic prediction equations.

"Of course. That's what I used. But you know how good they are, until we get more data."

"Yeah. Might as well use the California Approximation . . . one minus the square root of the logarithm of three guesses.

"O.K. Plus ten days is a fast earthquake, but it does give us time to try for a prediction. That's what we're here for." Sid had made his decision. "Dan, put your tilt program on timesharing. I want to keep sampling that data."

Dan nodded and set up the appropriate instructions.

"Arthur," Sid directed, "start the microseism program. Let me see your first approximation on depth of locus."

"Right, Skipper." Arthur keyed: MICROPLOT OUTPUT PLOT. The display screens went blank and the X-Y plotter began moving to mark the intersection points as the computer calculated them.

"I'll need to change paper now, too," Arthur said. "Half of my recorders are due to be changed—repapered—around 6:00 hours this morning. I'll do it now, so we don't get caught in the middle of any activity."

"Good enough. One more thing." Sid raised his voice. "Listen, everybody. Girls, you especially.

"I have a hunch that this is going to be a good-sized earthquake. It's got all the signs, so far, and it looks like we are right on top of the focus. Now, nobody knows what that means on this planet. We are the only seismo station on the ground and this is our first quake.

"You all have seen the geophysical maps of this site area and you know why we picked it. It is an active area, but if past experience on other planets can be used, it is a safe enough area. We will know a great deal more about *how* safe after this quake.

"In any case, the bunker has been designed to stand up to very high stresses—protect the instruments—and, even though that design was set up for a manned EDT bunker, I still think there is some hazard level for people—for us.

"So, as of now, we go on a Class A alert. And, since we are going to stay in the bunker during the worst of the activity, that means snatcher belts on all personnel. *Now and always.*

"Lorraine, you are standing by the emergency cabinet. Your two belts are in there. Take one and

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give the other to Julie. The other three are for us. Pass them out, will you?"

Lorraine popped the door off the green safety cabinet and silently took out two metallic web belts and their power packs. She handed one set across to Julie and put the other around her waist. She energized the power pack with a little nervousness, then distributed the others to the waiting men.

"Remember, all of you, EDT set the tolerances on these belts for severe earthquake stress. That means these belts are dangerous. They won't protect you from ordinary accidents, so keep your fingers off hot circuits and don't trip and break a leg . . ." He brought up a mental picture of Lorraine's legs, crushed and bloody like the construction man, Barney, and shivered. "We've already had one accident with one of these EDT belts. I don't want another one. Don't get careless!"

"Accident, Sid?" Arthur asked. "Where?"

"One of the general's jacklegs," Sid said shortly. "He got hold of one of these belts and got trapped in a falling scaffold. A normal industrial belt would have distorted him to the safety chamber at Site Two. The EDT belt didn't work and he was broken up. Whoever gave him that belt might have killed him, if things had been a little worse."

"Skipper," Arthur's voice was deeper than usual, "the general got that belt out of our stock. His recslip is in the locker; signed and thumbprinted. I saw it last Monday when I ran the qualification tests on the belts in stock. He must have picked it up himself. There's no charge record."

"The general," Sid said. "Yeah, he might. Well, that's another bone I've got to pick with him. Forget it for now.

"But remember what I said about these belts of ours. Keep them on, but don't get careless. You understand? I mean this seriously. The belts will distort you out to the orbit lifeboats if their safety limits are exceeded—heat, shock, G-load, your own pain or fear levels—but they won't save you if you aren't wearing them. Keep them on! Wear them all the time. I mean, all the time. They are waterproof and shockproof, so that means in the showers, too. Shower in bathing suits, if modesty worries you."

"That is a heartless order, detrimental to troop morale," Dan quipped. "How can I survive a disaster without anything to look forward to when I arrive at the lifeboat?"

"What do you suggest?" Julie said. Her voice had just a little quaver in it. "Doubling up the number of showers to increase the statistics and prevent infection?" That wasn't one of her best sen-

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tences. She couldn't prevent a few twinges of fear from showing. She and Lorraine had used the belts in training rescues, but she hadn't liked the feeling when the distorter circuits warped her into the rescue chamber—instantly, regardless of what she was doing. Julie did not like snatcher belts.

"Doubling up in the showers?" Arthur got into the game. "Nominations for a new station commander are now in order. That's the best policy statement I've heard in this bunker."

"Better save the politics until after the quake, you clowns," Sid said, laughing. "Meanwhile, get where you can all see me and I'll pull the lifeboat handle. Regulations call for an 'All Hands Witness' when I do." He waited until they were in position, then pulled a red handle on the safety board. The handle came out of its clips, opened a switch and then came away from the board in his hand. The switch couldn't be closed again.

"The life-support systems in the satellites are officially powered up. It will be so logged." Sid signed his name to the safety log and put the handle away in a drawer.

High over the station in a stable orbit, the spherical hull of the EDT lifeboat satellite began to increase its interior air pressure and warm itself. Lights came on in the padded central chamber. This chamber was the center focus of the distorter mechanisms in the lifeboat's hull. When the snatcher belts activated, the space between the belt and this focus didn't exist and the person wearing the belt was snatched into the safety of the padded lifeboat. These snatcher distorter circuits worked continuously, and had been working since the lifeboats were left in orbit. The switch Sid had operated had no control over the distorters. He had activated the survival and life-support systems only. But he had set up the lifeboats in anticipation of a catastrophic accident—that was what the red handle meant; it never meant less.

The concept was, of course, sobering even to EDT personnel and the noise of the recorders and instrument relays grew very loud, as the crew thought their own thoughts. Even Julie's forehead held a frown of worry; her eyes darkened and became serious.

One by one, the three lifeboats completed the power-up cycle and three repeater telltale lights on the switch panel lit up green.

"That does that," Sid said into the silence.

"Look," he said to the solemn faces around him, "it's not that bad. We are all set up here to get as much information out of this quake as these instruments can give us. The bunker is designed to stay intact through a catastrophic quake . . .

"And remember, about the bun-

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ker . . . it's not tied down to the foundation slab—or to the barracks section either. The bunker will move around. So, when things get close to the trigger point, I want everybody inside here—the doors may not be safe.

"As I said, the bunker is safe; you've all been trained for this. It's been done before by other teams, so we shouldn't have any trouble. We are all set up to ride out Canis IV's first official earthquake and it's just a job. Right?

"Stick with the job and try to ignore the fear symptoms. With any luck, we'll be too busy to do any screaming.

"O.K., everybody, speech over. Back to work. Get the pick and shovel stuff done, troops. I'd like everybody to stay on duty until about noon. Then I'll set up a shift roster and we can settle down to a long watch. That sound reasonable?"

"Commander," Julie said, "the gravity experiment is all on automatic and working. I can't do anymore until I start reducing data. What do you want me to do next? Where can I help the most?"

"Give Arthur a hand with the seismograph papers, will you? Then let him brief you on the microseism program we use here. That should be interesting and it will need two people shortly.

"Dan, stay on the tilt machines, please.

"I'm going to put on a clean uniform and call up the colony brass. General Derrick has to know that he's sitting on a fuse."

Sid left the instrument room, trotted to his quarters for a quick change, then pushed into the radio shack—the south end of the barracks section. The radio shack was his communication center, completely enclosed in beryllium copper screen so that the stray broadcast signals would not disrupt the sensitive earthquake instruments. Only shielded cables to the focused antennae, and equally shielded and grounded FM intercom connections to the Bunker, led outside the protective screen.

He opened the single circuit vision-phone to the colony construction site and let it ring. There were only two people on the other end: General Bat Derrick or his night duty man. Sid didn't care if he woke them both up. In fact, if they didn't answer the phone pretty soon, he'd kick on the alarm repeater and wake up the whole camp.

The raster cleared and General Bat himself was on the screen. The phone had gotten him up, but not fully awake and he was looking very un-generalish. His military title was largely fictitious, maintained by him as part of his public personality. This morning he was showing a different personality. Bat Derrick had fought and punched his way through all of the bad

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jokes generated by his two names, and this morning his face showed most of the lines. He had a new, unlit cigar clamped in his teeth and his eyes were almost hidden by the scar tissue around his eyebrows and eyelids, still swollen with sleep.

"Well," he said, then cleared his throat with a noise very like an Afro-lion. "Well!"

"Class A alert: earthquake emergency, General," Sid said crisply. "We are running a prediction on a major earthquake. Your camp and building at Site Two will be very close to the epicenter."

"When? How safe are the barracks?" General Derrick's eyes gleamed open. He took out the cigar.

"One to ten days. We are refining the prediction, now."

"Ten days! You woke me up to tell me— Two weeks from now! What do you expect me to do about an earthquake anyway? What's so urgent that you have to get me . . . Do you know what time I left that party of yours, last night, Thomas? What kind of a gag are you pulling?"

"You sent the invitations to the party, General," Sid said. "And this call is no gag. We will have a very real earthquake. The first one we've had on Canis IV."

"And timed to impress those two stacked bunnies you shipped in to share your loafing time, huh?" Derrick lit his cigar. "You real sure you got a groundshaker, boy? Have you checked on your women? Maybe their bunks ain't spring mounted. Heh, heh, heh."

"Clean up your mind, General. I'll be over at 11:00 hours to brief you and your staff—if we have that much time."

"I'll be over at Site Four, pouring concrete for the fishing dock complex. *I* haven't got the time."

"Scrub it, General. Site Four is only ten kilometers from the South Fault line. An earthquake can be serious there. Besides that you had an accident at Site Four last night—this morning about 01:00 hours. The concrete Dewar collapsed. You should get a report . . ."

Bat looked down at his desk, picked up a half-page card—he liked condensed reports. "Oh, yeah, it's on the morning report," he said. "One of your snatcher belts didn't work. Hm-m-m. Your earthquake's a week off schedule; your dumb safety belts don't snatch: I'm getting tired of your incompetence, Thomas. Don't you EDT have any reliable equipment?"

"Why you . . . !" Sid snapped. "You can't blame that accident on me. I know where that EDT belt came from and you had no business using it on that job. General, you know the tolerance levels for Earthquake Detection Team equipment. You know them as well as I do. If you try to pin that accident on me—faulty equipment or any other reason—I will have you up before a Fleet court for criminal

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negligence. You left a thumbprint and a requisition in the storage locker . . . Or, I'll get you for stealing."

"Cool off, Commander." General Derrick lit his cigar. "I have the right to requisition any equipment or supplies on this planet. It's in my Contract Articles, it always is. That rec-slip is right in line with the book, Mister. I am running this construction project and I am the boss dog on this planet until the Colony Administration takes over. Read my contract, Commander. Read it! Don't threaten me.

"And while you are reading. See if you can find a regulation about nonstandard safety equipment—your equipment; nonstandard and nonworking snatcher belts. Nuts! Sissy stuff. That jackleg wouldn't have got hurt if he'd run instead of waiting for your belt to save him. That Dewar structure must have collapsed slowly. They don't go all at once."

"Unless it's overloaded so you can work all night to make a schedule," Sid said. "O.K. Don't start anything, General," he added, trying to find something specific that would impress Bat's stubborn face. "I'd shut down Site Four, if I were you. I wouldn't want to be responsible for a skip load of concrete under these conditions. If it starts to slosh because of ground wave action, it will tear your rig apart . . ."

"You are not responsible, Thomas. I am," Derrick cut in. "Let me do my own work, Commander. My schedule is tight and I always make my schedules. I have to work for a living."

"Very well." Sid's anger reached a plateau. His voice got stiffly formal. "You may use your own judgment about whether to stop work right now, or not, but the regulations do require you to be aware of some routine safety precautions.

"For instance, *your* snatcher belts will no longer return men to your chamber here on-planet. It is automatically cut off when the lifeboat satellites are powered up.

"And be advised, General, that I have activated all three lifeboats at 5:45 hours: in accordance with my emergency authority."

"I'm proud of you." Derrick's sarcasm was as thick as his cigar smoke. "Now get off my phone. I want to order breakfast." Derrick cut the connection from his end.

Sid let his anger ride up; trying to suppress it only made him madder. He switched off the comm with a violent thumb jab and began to swear. His vocabulary was specific, pungent, physiologically impossible—even for Bat Derrick—and soothing to his, Sid's, emotions. His anger drained.

"That guy just rubs me the wrong way," he muttered. "That was no way to handle him—giving him orders like a sub-lieutenant. There must be a way to deal with

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him without making everything a personal conflict."

He shook his head. A course in Business Sensitivity ought to be included in every seismologist's training . . .

One more chore. He coded the Class A notification, Dan's prediction, and his power-up of the lifeboats, into space code, transferred the code symbols to the minicomputer tape printer linked to a repeater on the orbiting distorter ship. In one three-second burst, this repeater made a punched computer tape and injected it directly into the distorter link. The output of this system was a printout terminal at the Fleet Base on Earth, twenty thousand light-years away. This terminal gave Sid a direct command link with his EDT Headquarters when he wanted to use it. A link that was monitored, by means of a copy tape, by Captain Henery in the orbit ship.

"There," he said, talking to himself, "my personnel, construction personnel—assuming Derrick tells anyone else—and Captain Henery and his crew in the orbiting ship: The whole human population of Canis IV—notified of Predicted Earthquake Number 0001. Duty done: by the book . . . hm-m-m, let's see now . . ."

Sid reached into a cubby and took out the red volume of Fleet Regulations. The phrase "by the book," had started him on a line of worry. He didn't think that Derrick meant his threat about blaming the accident on EDT equipment. A simple test check on the belt's tolerances would prove that they worked and Derrick would figure that out before he filed formal charges. But he might try something else. Sid turned to the section of the Manual covering his duties as Safety Officer on Canis IV. The construction of all the installations on-planet was Derrick's contract, his responsibility, but, since there was an EDT team involved, the field safety of those operations was a Fleet responsibility—Sid's second-hat job. He skimmed the regulations; refreshing himself on things he had been told in pre-posting briefings. His reading didn't seem to be telling him anything. After a time he closed the book and stuck it under his arm.

"There's supposed to be a Fleet regulation to cover every problem," he mused. "Even Bat Derrick's . . ." His hand strayed to his snatcher belt. "And snatcher belts that don't work . . ."

Suppose, he thought, *suppose these belts aren't working . . . or set too high—which could be just as bad, if this quake we are predicting is really bad.* He shook off the mental picture of the man at Site Four. The belts *would* work, they had to . . . The earthquake data was vital to this colony site.

"Aargh! Nuts," he said. The bunker was built well. He had to give

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Derrick credit for that at least. The bunker would ride out any earthquake. That was the plan and he would stick to it. Besides, he had a good team—a very good team. They'd get the data and see the job through. The rest was just nerves—pre-quake tension. Sure, that was it. He hadn't felt this way in so long, he'd forgotten the symptoms.

"Just normal earthquake jitters, you dope," he told himself and dismissed his morbid worries. "Get the belts tested and you will feel better."

Thomas let himself out of the radio shack and ran into Lorraine. He folded her in his arms to keep them both from falling.

"Hey, sorry," he said. "This building has room for everything but people." He kept his arms around her. Her warm softness was the kind of personal conflict he liked. She didn't struggle, merely stood in his embrace until he became embarrassed and released her.

"How's our earthquake doing?" he asked weakly, trying to sound businesslike.

"Dan says the tilt activity has leveled off," Lorraine said calmly, as if nothing had happened. "So I came hunting breakfast. Is the galley in the same place as the simulator?"

"Yes, but the radar oven doesn't work. Arthur had two circuit panels out for repair and spilt honey on them. Earth-base hasn't sent us replacements yet. I don't think they believe the requisition chit."

Lorraine laughed. "You three have been alone too long. This place needs a woman's touch."

"Give that line to Julie and you *will* stop work."

"Maybe I will: it will go with her collection."

"So!" Sid smiled. "She does do those sentences on purpose. I might have guessed. Those one-liners are just overcompensation for her . . . brains, huh?"

"Something like that," Lorraine laughed.

"Go on and get breakfast," Sid said. "Ring the dinner bell when you're ready and I'll come help with the trays."

She turned away and disappeared into the galley. Sid frowned again. The sight of Lorraine's trim figure, uniform skirt and thoroughly feminine legs were delightful, but they brought his worry jitters back in full force.

He had no right to risk the two girls; no right to turn those lovely legs into the bloody mess he'd seen this morning. There was one thing he could do . . .

He went back into the communications room and turned on the mini-computer terminal again. He typed:

CANIS IV. CA93421 EDT 1
REF. M001 06:20PLT
MESSAGE 002 06:31PLT
THIS STATION BEGAN PREDICTION

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RUN ON CANIS IV Q0001 AT 05:45PLT. DUE TO INCREASED HAZARD SUGGEST HQ RECALL OF FEMALE PERSONNEL UNTIL SITUATION STABILIZES. REPLY SOONEST. THOMAS HOLDING.

He went back to his regulation study, waiting for the reply, but his mind was not attentive; also the wait was not long.

The terminal clattered its reply:

EDT HQ 3551
MESSAX 9416 06:45PLT(CONV)
CANIS IV CA93421 EDT 1
THOMAS EDTCOMND
REQUEST DENIED. ENSIGNS MCBRIDE AND DESTAMM QUALIFIED IN ALL RESPECTS SAVE EXPERIENCE. HAZARD PROGNOSIS SERVICE ACCEPTABLE.
EDT HQ OUT.

Well, so much for instant distorter communications, Sid thought, shrugging. *They told me the same thing I told Lorraine, so I guess I can't kick. The girls are on my team . . .*

"Forget it," he told himself aloud as he clipped the messages in the traffic log and closed down the terminal.

On the way out he turned down to the galley, stuck his head in the door: "Oh, Lorraine," he said. "Don't cook anything dangerous, will you? We might get a tremor anytime, now." He was making petty safety noises, but he had to release his worry some way.

"I know. I was planning hotplates," she said. "Nobody wants to leave the instrument room anyway." She opened the freezer door.

Sid nodded and left her to the job. He stopped in the quarters again and picked up shirts for Arthur and Dan. He debated on making a try for Julie's shoes and surrendered to cowardice. Let Lorraine do that, if she remembered . . .

Dan had two of his tilt program printouts tacked up on the data display board and was transferring printed data points to a printed map of the valley. Julie came up with another display printout.

"I've got smudges all over, but there are two high points you *ought to look at,*" she said.

Arthur choked and began rolling instrument paper frantically.

Sid smiled and spoke up to rescue his teammate: "Arthur, I squirted a tape to the distorter ship. Captain Henery may send down a lander. You had better set your discriminators to account for its ground vibrations."

"Yeah, I'll fix it. The location of the P waves would rule out anything I get from the Site Three lander area, I think."

"I'm not too sure about that," Julie said. "I've got a strong indication right under part of Site One. Site Two and Site Three are only a few degrees apart, as seen from here. We might not be able

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to distinguish between them without detailed analysis. Of course, we could check on lander movement by phone. . .

"But look here . . ." She put the printout up on the board. "I've got this strong indication, right under part of Site One—about forty kilometers down. It's just a first-look intuition, so far. The longer the microseism program runs, the more we can refine the guess."

"I'll go with the guess for now, Julie," Dan said. "Look at the tilt plot. The whole rock slab is tilting that way. We ought to get everybody off-planet, now. This is going to be a big one. I've never seen anything build up so fast. I'm not so sure about riding this one out. Can't we remote it and watch from space? Look at that . . ." He pointed at the console screen.

"Steady down, troops," Sid said. "Don't get too excited. You all have to be pretty sure about this, you know. This is the only earthquake station on this planet. We can't get a check on any of our data."

"Sid, you need some breakfast," Dan said. "You aren't thinking. All this data we're getting is close-in stuff. If there were two hundred stations on the planet, they couldn't tell us anything more. Most of them wouldn't detect any of this—wouldn't detect anything, until we get some foreshock activity. I tell you Skipper, we're going to be right on top of this one."

"You give me some nice foreshocks and I'll know we are having an earthquake; and where," Arthur said.

"So will the whole colony site," Sid said. "Our job is to predict them, not just to record them. Oh, I know," he stopped Dan's protest, "the more temblors we record on this planet, the more accuracy you can get into your equations: but I've got to start somewhere. And this—" he waved his hand at the printout sheets "—is going to have to be it.

"I want to go into a meeting at 11:00 hours and have enough certainty to tell Bat Derrick that he has to evacuate most of his personnel until we do have a quake—the main temblor; not just the first foreshocks."

"There is enough for me now," Dan said morosely. "But I know what you mean about General Bat. That is going to be a job of selling. We had better get to work on some pretty charts, I guess."

"Do that. Or better still, put some big neat lettering on the computer printouts to explain them," Sid said.

"Here's breakfast," Lorraine announced from the door. "Come on and do some eating. This sounds like we are going to work through lunch." She passed out a trayful of hotplates.

"If our baby earthquake gives us time for lunch," Dan said. "It could break loose any time. That

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ten-day prediction is a way-out maximum." He pulled the seal on his hotplate and waited for it to warm.

"Aren't you cheerful," Julie said. "Well, me for breakfast. If I'm going to do any shaking around here I want to do it on a full stomach."

Arthur exploded into his coffee.

"Dan," Sid ordered. "While we're eating will you run a test check on our snatcher belts and log the results. Do you have test cards for the girls' belts?"

"Yes, Skipper," Dan said, reaching for the tester. "Their cards came in with their orders." Dan checked his own belt, punching the test buttons in sequence and watching the dial for a red indicator, then he moved to Arthur and Sid, changed cards, and approached Julie with some obvious hesitation.

"Come on," Julie said, holding her arms up, elbows shoulder high. "I know I'll test out wonderfully. Plug it into me."

"He's getting a red indicator on his ears," Arthur rumbled blandly. "Do you suppose it means anything."

"They are all green, Skipper," Dan reported after checking Lorraine's belt. "And I suppose my ears are still red; whatever that means."

"It means my tummy belt is all warm and safe," Julie said.

Arthur choked again and began coughing. Everybody else concentrated on eating.

Sid let them finish breakfast, then drove them at it again.

The computer began to complete a mapping scenerio from the microseism telemetry and Lorraine demonstrated a flair for lettering in a standing position at the data display board. Lorraine also found some old planetary crust surveys in the library records and had them blown up as large as the printout paper would allow.

The presentation took shape quickly.

At 9:00 hours, Sid called it quits. He took Dan off duty for a one-hour break and lay down himself, to try to make one hour cover a lost night's sleep.

At 10:30 hours, Sid took the charts outside and tucked them in the skimmer. He flipped a wind cover over them and buckled them down. A soft wind was twisting the trees on the other side of the EDT clearing. It sent scurried puffs of powder paint from the skimmer landing circle. The morning breeze from the bay, reaching inland as the sun rose, cleared the sleep fog from his eyes even though the rest hadn't refreshed him much.

The sky overhead was still clear. The cold gray-white sun was misty in a thin cloud cover on the horizon. A thirty-eight-hour day made for long dawns and sunsets at this latitude.

Lorraine came out wearing a fresh uniform; her hair pertly arranged. Sid wanted her along when

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he met General Derrick; partly for the decorative shock effect, but mostly for her skill as a seismologist—most of the presentation was her work.

Her smile completed the work the cool air had started and Sid felt almost human again. He stopped his sky gazing and took the skimmer up and headed west for General Derrick's construction headquarters and Colony Site One.

A fleet skimmer was aground in front of Derrick's headquarters. Even from high altitude, Sid could recognize Captain Henery's tall figure standing by the pilot.

Sid grounded his skimmer close to the other and called out, "Captain Henery. Glad to see you. Did you come down for the briefing?"

"Yes, I did," he answered. "And so did those other types in the lobby. I think I can see all six of the general's first mates in there. Who do you suppose is minding the store?"

"The general, undoubtedly," Sid said dryly.

"You may be right. I got my invite from General Derrick. He sent it up by hand this morning with the *Ready Go Now*." Captain Henery pushed his hat back on his head. "She docked with us for a cargo shift, just three hours behind your squirt-message, don't you see. I was curious as to why the general wanted *me*. The earthquake is your problem, surely.

"Anyway, I brought down the other lander, *Corry Ann* instead of riding *Ready Go Now* back. I thought you'd need both boats on-planet. Quicker that way.

"Will you introduce me to the lovely ensign?" he said, changing the subject.

"Of course," Sid said. "Captain Tom Henery, may I present Ensign Lorraine DeStamm. Miss DeStamm, you have permission to be informal. Those presentation charts make saluting difficult. Captain Henery is a Senior Fleet Captain and will accept your informal salute."

"Thank you," Lorraine said. "Happy to know you, Captain." Her arms *were* filled with the bulky charts.

"Likewise, Miss DeStamm." Captain Henery took off his cap. "I find that the on-planet personnel of this rock have become a hundred percent more interesting. I must plan to use up some of my accumulated shore leave. Because of my *advanced age*," he glared at Sid in mock fury, "I need a lot of shore leave."

"Let's get inside, Captain," Sid said. "The briefing starts at 11:00 hours. I want to be there ahead of Bat, if we can get through the gang inside."

"Lead on, Commander. It's your earthquake." Captain Henery followed Sid through the doors of the headquarters building. He held the slide door open for Lorraine.

"Gallantry supercedes Fleet

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protocol, Ensign. At least it does on Canis IV, from now on. After you," he said and bowed her inside.

Lorraine laughed cheerfully and maneuvered herself and the charts past him.

The chorus of greetings for Sid turned to an appreciative silence as Lorraine came in. A low wolf whistle broke the quiet.

"The rumor factory said you had *arrived,* Ensign," Wisenski, the steel man, said. "But that's all. Lousy rumor factory. I'm sorry I missed that party last night."

"Who cares about an earthquake . . . now . . ." That from the whistler.

"Hey, yeah?" somebody asked. "How about the earthquake, Commander. Are the rumors 'bout that as accurate as the ensign? The beautiful, unknown ensign . . . I had the duty last, too."

"Ensign Lorraine DeStamm, gentlemen," Sid said, supplying the asked-for introduction. "Miss DeStamm, these wolves are General Derrick's first team. Watch them every minute."

"That won't be hard to do, miss," Wisenski spoke up. "Watching us, I mean. We will be glad to help. For instance, we have a river of food fish off the coast here. They are quite a sight by night," he said, trying to make it seem an afterthought. "They glow. Would you like to see them some evening? I would be glad to show . . ."

He was whistled down by five or six wolf whistles.

"Disregarding Wisenski's motives," Sid said, when the laughter died. "I can answer the first question. Yes, there is going to be an earthquake, Stevens. That much is fact: not rumor. We are predicting it now.

"You all know I've been expecting a quake. This site was picked because we didn't want the colonists to get surprised by an earthquake they didn't know about. New colonies have it rough enough without surprises.

"I . . . we picked this site because we wanted a place where the probability of an earthquake was high. EDT didn't want to wait around fifty years for the first ground tremor. We wanted a fast earthquake.

"I admit that this one is a little faster than I bargained for."

Everybody laughed at that.

The lobby door slid open and General Derrick stood there holding the door open with one hand. He was wearing tailored coveralls and a dust cape.

"I will have to get you guys back on the job," he said. "With this much talent out of the field we're working at half speed.

"Hi, Thomas. You are on time, at least." His voice was heavy and overloud. "I got a break in the work, so I skimmed back to hear what you had to say."

He turned and began to stamp

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the mud off his boots against a plate, and brushes bolted to the floor. "Be with you in a minute," he said. A fine spray of concrete dust from his cape spiraled up into the lobby fans.

Sid shook his head. Derrick had evidently gone ahead with his job of pouring concrete, just like he had said he was going to do—danger or no danger.

The inner lobby door opened and General Derrick's operations boss, Paul Ramierez, came into the lobby. He was his usual neat and spotless self, the effects of last night at the accident site were gone.

"Conference Room A," he said, making the announcement sound like General Derrick had more than one conference room. "Everybody is here, General. Did Jorgensen come in with you?"

"No." Derrick let the door slide closed behind him. He produced a cigar and lit it. "Jorgensen is pouring. You can tell him what he needs to know." He puffed a cloud of smoke in the direction of the conference room door and walked toward it, leaking cigar smoke like a steam engine.

The group of foremen, long conditioned to following Bat around construction works, swung in behind him; almost in parade ground timing. Sid motioned to Lorraine and they tied on to the end of the train, hurrying to keep up. Captain Henery came last, with more dignity, but the effect was still a parade: a parade led by General Derrick of course, through his administrative office spaces, but a parade. The general staged effects like that with a sure instinct.

Sid had time for a quick glance at Derrick's inner office—a white-collar type at his tape-desk—then the group was across the office and through the double doors into Conference Room A.

"I want to start right away, Thomas. Go ahead!" Derrick said. He sat down and waved his cigar at the far end of the conference table.

Lorraine went over and began putting the charts up on the display rack. Sid put his note folder on the end of the table and said: "Before I get started, General—I noticed a moment ago—your clerk in there, he wasn't wearing his snatcher belt. Could you have somebody talk to him about the safety directives? He's not that safe, none of you gentlemen are, even inside this building. Under the worst conditions this earthquake may produce a great deal of ground energy. I meant my Class A alert to apply to all of your personnel, General."

"Merrick." General Derrick dismissed the clerk with a wave of his cigar. "He hasn't got one. Neither do I. I sent all of our belts back to Fleet Base this morning for replacement and recheck. I don't want defective equipment on my job. Won't stand for it!

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"There are only five belts on the construction site and my jacklegs are using them to pour dock walls over at Site Four. They're working under a concrete flume and a flying Dewar. That is dangerous work, Commander, as you mentioned to me once yourself. Highly dangerous work. I'm not about to take a belt away from a man on that kind of a job and put it on Merry. And I won't give him a belt that doesn't work, so don't bring up your spare equipment problems.

"Now, you go on with your speech, and don't mind me."

Sid began his presentation, but he wasn't at all sure what he said. He was telling the men seated at the table about the quake that was predicted, but his mind was literally stunned by the implications of the general's remarks about the belts. Derrick had been almost casual in his statement that he had only five snatcher belts. Sid knew that Bat had been adding to his work crews steadily ever since the distorter ship had stabilized the link for human traffic. He had some one hundred and fifty men aground on Canis IV; a hundred and fifty men, with no major safety devices to get them off-planet in an emergency. Outside of the legal implications of liability, General Derrick's lack of safety equipment for his men was corner-cutting so insane as to be unbelievable.

Sid kept on talking. He didn't know what else to do. Finally, somebody asked a question—Sid never did know who. The question gave him a break. He used a weak lecture technique of asking Lorraine to field the question and sat down to let his mind catch up and try to think of a way to sell Derrick on early evacuation of his men.

Lorraine took over smoothly. She answered the question, turned over a chart and pointed out the data plot used to give that particular answer, then she went on to explain the other pieces of the puzzle used to predict the quake.

Bat Derrick continued to ignore her, as he had ignored Sid, but his indifference didn't inhibit his department heads. They looked at the data and asked sharp questions. Lorraine reacted to their interest. She showed them the way the concentration of data from the microseism records was converted to figures for the prediction equations; told them where the constants were applied; and solved a time determination for them—using numbers they had asked about.

"Miss?" somebody asked. "That solution you just did comes out thirty-six hours till the quake. I thought, Sid . . . The rumor was . . . ten days. How come the difference?"

"Difference in these numbers, here and here," she said. "The math is easy once the computer solves the data reduction sequence

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and puts things on this kind of printout. I'm not making it easy just for show. The thing that makes it seem that way is that this is just one problem. The type of crust strains we are using for data, give us several hundred readings per hour, sometimes.

"That's why I use the computer program, instead of an aspirin bottle." She got her laugh and went on.

"A statistical analysis will give the most likely time, but we won't have enough data to make that analysis mean much until just before the quake hits. By that time we'll be using other, more precise indicators, to predict the exact time. Meantime, we are getting prediction times all over the place. Commander Thomas' ten-day figure is the upper limit. We passed the zero limit five hours ago. We also passed several predicted times around the start of this meeting."

"Not very precise." That was Stevens, the construction foreman.

"I hope you can build a house better, Steve," Sid cut in. "Look man, the planet is new. Nobody knows what its EQ energy level will be. The Fleet put in one EDT station and one colony town site, so that we could begin survey and measurement operations, but you've got to realize what I'm working with. I'm doing prediction work with one station. Back on Earth, New Zealand University alone runs thirty-five.

"I am sampling internal pressures with one test bore— You ran it in for me, Ramierez. I ought to have fifty.

"You all know this. We have to build this colony town site. You have to build it while I work with the one EDT station. One of everything, until this planet gets enough people on it to support more.

"Hell, we even put this town down here right between two known, visible faults. Where else could we put it so that the EDT data would be familiar, not strange—different? Finding this valley and the bays on the fish migration flow was a terrific bonus. But the earthquake pattern was what we wanted—a familiar one. Well, it is familiar. We've all of us seen this pattern before. Something's building up pressure under the slab of rock we're sitting on. We know this. When the pressure gets high enough, something's going to snap—break—and relieve the pressure. We know this. That's when we get an earthquake. *We know this.*

"The thing that's different about this one, is that we are sitting on top of the epicenter. The earthquake will happen *here.* Once the quake starts there will be no warning. I've got to make you believe in the signs and data we are getting, now. They are all the warning we're going to get."

"Then we ought to get out," Stevens said. "I didn't sign on to

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watch these buildings crack apart. There are two boats out there on the landing pad. Let's get the men in here and start moving them up to the distorter ship."

"Calm down, Steve," Wisenski said. "There's plenty of time for that. The Site Four crew is the only one far away. Everybody else is here at One and Two."

"Yeah, and that's where the shaking's going to happen, he says." Stevens stood up. "I want out, now!"

"Sit down, Stevens!" Ramierez's voice could crack like broken steel when he wanted it to.

"Thomas, are you saying that something's going to break right here in the site?" General Derrick asked suddenly, ignoring the outburst.

"Not exactly," Sid replied. "The break I was talking about will be down underground; maybe forty kilometers down.

"Let Miss DeStamm show us the cross section chart."

Lorraine flipped the right chart up to the display position.

"You ought to recognize this, Steve," Sid said. "It was drawn by your seismo-survey shots—when you were picking foundation sites. Remember?

"Now, there is no scale to this diagram and the red circle you see is just a guess at this time. That's where we expect the focus will occur, based on previous experience on Earth. Most quakes of this type trigger in the upper basalt, not down deep."

"Forty kilometers down, wow! How deep do you call deep, Commander?" Wisenski asked.

Lorraine laughed and answered, "Around a hundred and sixty kilometers. These colors show the crust rock section that the colony is sited on, and below that . . ."

Sid let her go on explaining the chart while he considered the men listening to her; trying to assess how many would be on his side when it came to voting on evacuation. The construction foreman, Stevens, was smoking his second cigarette, rapidly, worriedly. General Derrick was again staring absently at the tip of his cigar, apparently not hearing a word. The others were listening. They were looking intently at Lorraine, or at their coffee cups, but they *were* listening . . .

Sid's attention was suddenly riveted to the tip of Lorraine's pointer where it rested against the chart.

The tip had begun to chatter against the chart.

Lorraine noticed it too, and held the pointer in the same spot. She continued talking, but the pointer didn't move.

Sid quickly stood his pencil point on the table and held the pencil loosely between his thumb and forefinger at the balance. He turned his head to look directly at the coffee carafe on the service bar—its

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clear glass bowl half full of coffee . . .

Silently he began counting hippopotamus to time the seconds.

One hippopotamus. Two hippopotamus. Three . . .

He got to seven . . .

The liquid in the coffee carafe gave a lurch and began to rock back and forth. Sid hadn't felt anything in his pencil tuning fork, but as he looked down at the eraser, it blurred.

Very close. The first shockwaves—P waves—had vibrated the charts under Lorraine's pointer; the second, the S waves, jolted the coffee and his pencil. The difference—timed a little more than seven seconds—put the quake locus fifty kilometers down. Not at the epicenter Dan Ames had plotted, but very close. The tremor was small—2.0 or less—but Canis IV had just experienced EQ 0001FS.

No one in the conference room had felt it. Lorraine perhaps . . . She had felt the pointer rattle, he was sure. But she was standing up . . . her balance centers would have adjusted for the small movement; she wouldn't have felt the tremor. Not with the thick conference room carpet cushioning it.

The tremor was a very small quake, but it was a foreshock for Arthur's Milne equation program. Arthur would be working on the seismograph tapes with both hands.

The phone rang.

Oh, ho, Sid thought. *Somebody felt it.*

General Derrick picked up the phone and said: "Bat." He listened. "I'll be right there," he said, then hung up.

"Accident out at Site Four," he explained. "Another accident. The flume broke." He looked directly at Sid. "No one was near it. So we don't have to worry about snatcher belts, this time." He stood up and said:

"This meeting is over!"

"Hold on a minute, General," Sid said. "You can't leave now. You have to decide on an evacuation time. There are two landers at the port. They can take everybody off, but you've got to start now. Right now. It takes time to load a hundred and fifty people."

"And you've told me I have ten days, Commander," Derrick said quietly. "Surely I can repair an accident."

"That ten days is a guess."

"Then stop guessing." The general bit down on his cigar. "All I've heard from you is guesses, suppositions, 'I expect', and 'based on what happened on Earth' stuff.

"Well. That stuff ain't good enough, Thomas. I'm not going to order a panic evacuation as long as you have those two women onplanet. I don't figure my men are in any danger. They're as tough as Fleet Marines and they are just as safe. You wouldn't evacuate Fleet Marines would you?"

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"What kind of thinking is that?" Sid said. "No, I wouldn't evacuate Marines, but their risk factor is higher."

Derrick snorted.

"Sure it is," Sid went on. "A Marine signs on to get killed; it goes with the uniform. But we aren't Fleet Marines, Mr. Bat 'General' Derrick. You and I . . . we aren't allowed the luxury of killing men on this job.

"Wake up, General. You've got one casualty already because you tried to get around the safety regs. And that dumb stunt with the snatcher belts . . . that's so far out I don't even think there is a regulation to cover it."

"Your safety regulations are too strict," Derrick grunted in his throat. "Relax them, so I can get some work done."

"Sure I will," Sid's voice was tight with his anger. "Easiest thing in the world. Put some numbers on your request, General. *Give me a kill factor!* You tell me how many men you are willing to kill and I will turn off a lot of rules. How many a month? Three a day . . . ? Set up a man-hour ratio . . ."

"Aargh, don't talk guff!" Derrick said.

"I'm not." Sid came back. "I'm talking evacuation. Evacuation before you kill some of your men; when the earthquake catches them on-planet. I'm talking evacuation."

"Well, I'm not," Derrick snarled. He waved his cigar like a weapon. "I'm talking construction schedule, Thomas. My schedule! I built all those instrument locations and that fancy bunker for you; on schedule. Now, I'm building the colony town site and the fishing docks. I have a schedule for those too, and Contract Articles to finish them. That's my job.

"Your job, Commander, is to fiddle with the instruments we gave you. *Not mind my business!* I say what I can do and can't do at these building sites, Commander. Nobody else. Now, go back and play with your dials and pretty girls and let me work.

"Paul, send me up three carpenters!" He lit the cigar with a flash of lighter fire and left the conference room.

The meeting broke up and streamed after him, leaving Ramierez, Sid and Captain Henery sitting at the table. Lorraine began stacking her charts in order.

"I'll set up another appointment for you, Commander," Ramierez said. "Probably not today, though. . . ."

"You get to him, Ramierez," Sid said, grimly. "Make him see that he's got to start evacuating people, now.

"I didn't finish the briefing, Paul. What I'm predicting is a Force 8 earthquake. *Right here.* You've got to understand . . . I just don't know what our force level equations mean on this planet. But

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Force 8 anywhere else means the quake will be fast and violent. You've got to get the work crew off-planet."

"I'll tell him," Ramierez said. "Leave your report. I'll get him to read it. But stopping work . . . I don't know. That's not something Bat likes to see."

"Neither is a death list," Sid said. "Try and push him.

"Well, let's get back, Lorraine. There's lots to do. I want to refine the prediction time as fast as I can."

Sid wasn't mentioning the small tremor. He wanted to see Arthur's tapes before he talked about it. Arthur had six short-period seismograph stations oriented in a pattern that gave him about eighteen to twenty triune locations for ranging on the focus of any earthquake. By the time Sid could get the skimmer back to the bunker, Arthur would have located the focus, epicenter and depth of the small tremor. He might even be running prediction sequences through the computer. One good solid forequake, even a small one, was like a road sign to Arthur.

"Mind if I come touristing?" Captain Henery asked. "I helped pull all your instruments through the distorter link from Earth, but I've never gotten down to see them installed, don't you see."

"Come along and welcome, Captain," Sid said. "We may get busy and ignore you a little, but I'll try and show you everything.

"Come on, Lorraine.

"Thanks, Ramierez. See you later." Sid walked out of the conference room. Lorraine and Captain Henery followed him.

Captain Henery fell in step with Lorraine as they came into the lobby. He leaned forward to talk past her shoulder.

"Commander," he said, "I've worked with General Derrick before, don't you see, and I don't speak up to his face like that; but he doesn't know everything about this contract he's got . . . even if he likes to say he does."

"I've worked with him before, too, Captain, but he's never pulled anything like this," Sid said. "How could he send those belts back? How could he be so stupid? He ought to have snatcher belts for everybody and two spares in stock."

"He obviously doesn't believe in your earthquake," Captain Henery said. "But surely you aren't thinking of leaving the evacuation to the safety belts and the lifeboat distorters, are you? That's too late, surely."

"Of course it is," Sid dismissed the idea. "You will have to use your boats to be sure. But the belts are a safety device . . . the quake could catch us . . . no snatcher belts . . . One hundred and fifty men and five snatcher belts . . . That's murder."

"Well, now, I brought down ten

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more," Captain Henery said. "They are SOE on the *Corry Ann*, my lander, don't you see. Ramierez knows they are there. He will get them and pass them out to men who will stay around and help. Ramierez is plenty smart.

"But that wasn't what I was leading to. It's my landers, don't you see—the *Corry Ann* and the *Ready Go Now*. Both of my boats down here are under *your* command, as of now—well, as of your Class A notification, by the log. It's in the Articles of Contract and I don't think General Bat remembers it, don't you see.

"Look, you're carrying the Red Book, Commander. Try Section 45; about 39.36, or thereabouts," Captain Henery concluded.

Sid put the Fleet regulation manual down on the skimmer's rail and turned to the reference. He read rapidly.

"By . . ." Sid snapped his fingers. "You're right. I didn't remember; Derrick sure won't."

"What?" Lorraine asked.

"That pretty EDT uniform you wear, miss," Captain Henery said. "It makes you part of the Space Fleet, don't you see." He put one finger on the page of the open manual. "When there is an earthquake emergency," he said, as she leaned in to read, "the Fleet backs you up with teeth, it does. Local EDT commanders get full and immediate cooperation of all Fleet units in orbit: *Direct* command of all units grounded on-planet. Lots of teeth, don't you see."

Lorraine nodded.

"Captain Henery," Sid said. "Maybe you better get back to your boats. You've got to start taking Derrick's people up to the orbit ship—even if it means doing it behind his back. That foreman, Stevens, is probably on board now; and some more of them will want to go, when Ramierez tells them about the earthquake prediction." Sid smacked his palm against the side of the skimmer.

"Get in quick," he said. "I'll divert by the lander Site Three and let you off."

Lorraine stowed the charts and got in behind the captain. Captain Henery took off his cap and said, "Go on to your bunker, Commander. I still want to see your place and there is time for that at least."

Sid nodded and took the skimmer into the air.

"How many people can you take in each trip?" he asked. "Using both landers."

"It's not people that's the problem," the captain said. "And you don't want to go ordering me off-planet so fast, either, Commander.

"It takes six hours, more or less, for a round trip, don't you see. My landers can blast up the gravity well, or ride down it to land; but they are all-or-nothing, automatic programs, don't you see. If I lift off

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with half a load, and your big quake hits, I can't come back and help until I get to orbit and stabilize over the landing field again—plus three hours.

"The best plan would be to sit on the ground and take anybody aboard who wants to come aboard, then wait it out."

"The landing field may get some earthquake activity before the main tremor," Sid said. "Would there be any danger of damaging the landers?"

"No. The landing jacks could be unlocked—like they are when we touch down—take up a lot of sway . . . all of the shock, maybe. If it got too bad, the lander could just take off. They're designed to do things like that.

"That *would* be the best plan, Commander. The first jiggle the ground gives will bring in a lot of customers for evacuation. It would be a good thing if both landers were on the ground with their ports open, don't you see."

"You may be right, Captain," Sid said. "There doesn't seem to be any good alternative."

"How about bringing back enough snatcher belts," Lorraine asked, "through the distorter link? Can you do that?"

"That's why I'm coming along with you and the commander," Captain Henery agreed. "Your EDT communicator will give me a chance to talk to Earth-base, don't you see.

"But I don't think I can do anything like that through the link, very quickly. We are a long way from Earth. The distorter link is fast transport, only when it is set up and tuned at both ends. The little task of getting a hundred and fifty snatcher belts delivered to our open link on Earth, may take a bit of time, don't you see. Unless we can catch Bat's shipment before it's broken up and routed to repair bases.

"However, I'll start it, I will."

The skimmer was circling the EDT bunker and Sid took it down to ground contact and switched off the fans.

"Lorraine," he ordered, "take Captain Henery right through to the radio shack.

"Captain, get the orders off to the landers first, then the query about the belts. Come on into the bunker when you are finished."

Captain Henery grinned at the orders and said: "Aye, aye, sir." He tagged off after Lorraine into the barracks section of the EDT station.

Sid crossed the wide foundation slab and went into the bunker port.

Arthur was standing at a data display board with a paper tape from one of the seismographs pinned to the board. He was the only occupant of the instrument room.

"Hi, Sid," he called. "Glad to have you back. This is the record

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paper from our local seismo, here on the board; or you can get a playback out of the computer. I've got it working on a prediction. Our time limit is going to pieces. It's dropped to ten *hours,* now."

"Where's Julie?" Sid asked. He went over to look at the paper record. It would tell him as much as the computer display.

"She and Dan went over to the deep bore tube to check temperature measurements," Arthur answered. "Julie was monitoring that panel when the tremor hit. She got some temperature rise—about fifty kilometers down, where we think the focus is going to be—then the telemetry went out.

"They took the second skimmer out to the bore shack. They were going to read the test dials in the shack and get the data back over the intercom. I jury-rigged a recorder mike, see?

"They just about had time to get there, when the second tremor hit. I've been so busy since, I haven't checked to see if they are ready."

"Second tremor?" Sid asked.

"Yes, Canis IV has officially had earthquake one and two. Both foreshocks; call them 0001FS and 0002FS, huh?"

"Great. I must have been in the air for the second one. Did they give you enough foreshock activity for a tight prediction?"

"Just great. More than plenty. I've got the Y-Z plotter mapping the locus now. The 274 is working time prediction and probable intensity programs for each of the remote seismographs. I'm holding our own local seismo, here at the bunker, as a control so we can look at it and study the shocks in real time, without bothering the computer's telemetering program. Everything is busy. If you want your bank statement added up, I'll have to take something off the line."

"Heaven forfend," Sid said. "I'll get Dan's thermal data for you—and keep out of your way." He went over to a comm-panel and punched the combination for the bore-shack.

"Dan?" he called. The sound system at the bore-shack was a speaker-microphone kluge—sort of an open intercom.

"Oh, somebody finally called." The voice was Julie's. "How do I work the phone? There's no mike that I can see."

"Just talk, Julie," Sid said. "The circuit is open now and works by voice switching. What's wrong? Is Dan there?"

"No, Commander. Dan is outside and I think he's hurt—although he may have gone for help."

"Help? Julie, what's wrong?"

"The earthquake." Her voice was breaking up with static. ". . . door shut. I saw him falling backwards . . . Now I can't open the door. I'm inside . . ."

"Radio, Julie! Use the FM intercom!" Sid ordered. "Do you hear me? The yellow panel to the right

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of this speaker. Your voice is going out. Radio . . . intercom, Julie!"

". . . hear you. Roger. Radio . . ." Julie's voice dissolved in a buzz.

Sid pulled Lorraine in from the doorway and put her in front of the comm-panel.

"Julie. She's in trouble," he said. "Keep listening, here. I'll be in the radio shack. If she comes back on, get her to call me on the FM intercom. It's the yellow panel . . . You heard me . . ."

"The phone's dead, Sid," Lorraine said, but Sid was already gone.

In the radio shack he kicked on the transceiver of the FM intercom station and heard Julie's voice: ". . . the door slammed shut. Then there was a second shock. I'm sure. The whole building jarred. Pretty violent."

Captain Henery, at the terminal station, turned and asked, "Trouble?" silently with raised eyebrows.

"Now the door is jammed," Julie went on. "I can't get it open. The latch in here won't work. Can anybody hear me on this? Listening, out."

Captain Henery tucked two minicomputer messages in the logbook and pulled back out of Sid's way.

"I hear you, Julie," Sid said. "How are you receiving? Come in!"

"Oh, wonderful. Very loud." Her voice was much brighter. "I'm stuck in here, Commander. Somebody's going to have to get me out."

"I'll get right over, Julie," Sid said. "Where's Dan?"

"I don't know. He is outside the door. The door knocked him down when it closed, I think. I just saw a bit of him through the crack. He was falling."

"Probably caught him off balance," Sid minimized. "I'll get General Derrick to send up some help. Stay on the intercom, Julie."

Captain Henery nodded, and left the shack.

"Commander," Julie called. "Don't go off yet. I'm O.K., but the temperature readings . . . the ones we came to check . . . they don't look so good. Can I read them off to somebody? The computer data bank ought to have this . . ."

"Do you still have outside power, Julie? Are the lights white, or red?"

"The fluorescents are still on . . . white. The outside lines are still up."

"O.K., you've got time; and you're right, Arthur needs the temperature readings you went out there to get. Can you read the dials from that FM station? The mike cord long enough?"

"Mike cord? Oh, yes. It's long enough."

"Very well, then. I'll put you on tape here and have Arthur code you into the computer.

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"Julie, listen to me. If the power cuts out, and you go on internal batteries, stop sending and save that intercom for rescue work. Understand?"

"I think so, yes."

"Very well. Now, I'm going to set you up to record. Give me about two minutes, then start reading the dials. Give me twenty minutes more and I'll be banging on the door. O.K., Julie?"

"O.K., Commander. But hurry please. The minutes are kind of long in here."

"Hang on and keep talking. We're on our way."

Sid picked up the phone to the bunker and told Arthur what was happening, concluding with: ". . . so you and Lorraine are going to have to run things by yourselves for a while."

"Let Julie talk. We do need the temperature readings," Arthur said. "That bore hole will give me some valuable data, if the fiber optics haven't sheared. You go ahead and get her out; we're O.K. here."

"Right. I'm patching her into your tape deck. Record everything, Art. This looks like it's building up to a really big shaker."

Sid hung up and set up the intercom to record. Julie began her dial readings. Her voice had a light quaver in it. The figures had some meaning to her, but she could see all the dials in the bore shack and Sid didn't have time to listen to her reading.

He hurried out to the skimmer.

Captain Henery was waiting in the skimmer. He had a wrecking bar tucked along his leg.

"Ramierez has two men on the way from Site Two," he said, clipping the skimmer's microphone back on the dash. "They'll bring a laser cutter.

"I got hold of my landers also. They will stay on the ground until they get all of Derrick's men aboard. The order went in for the snatcher belts, but they are estimating three days to get them back to the distorter head. Best I can do, sorry."

"Nothing else to do," Sid said. "You sure can't do any good yelling at them from out here.

"Let's go." He took the skimmer out fast and low.

The bore shack was northeast, in the opposite direction from the town. Site Two was southwest of the bore shack and closer to it than the bunker. Ramierez's men should get there first.

They did. Sid spotted the rotating beacon light on their skimmer before he saw the concrete cylinder of the bore shack. The second EDT skimmer was also on the ground. Dan hadn't gone for help.

The two men, the skimmer crew, were bending over something on the ground.

Sid slammed his skimmer into a landing and cut the power. The something was a man—Dan Ames.

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Sid ran out through his landing dust.

"How is he?" he asked.

"Alive." The bigger workman answered. "Doesn't look like he's got anything broken. There's a big lump on the back of his skull. Just out cold."

Sid was kneeling by Dan and could see these details for himself. There didn't seem to be any need for medical aid right now.

"Probably hit his head when he fell," he said. "Look, there by his foot; a surface crack. The quake split it open."

"You mean the ground's gonna open up, right here?" the small workman said. "Fred, you went and volunteered us for another rouser. I'm gonna. . ."

"Hold it!" Sid soothed. "That won't happen. The crack there is only three—four—centimeters deep. Just a split in the clay soil. Dan must have been standing right on it, to get knocked down. Threw him off balance. The rock here did the rest. The crack might have been what jammed the door, though. . ."

"The door?"

"Yeah, that door there. It's jammed and the girl is inside—Julie McBride."

"A girl!" The big man, Fred, started toward the bore shack. "Ramierez didn't say. . . Come on, Pete!"

The two ran over to the door.

Sid took the first-aid blanket from Captain Henery and folded it over Dan, then followed them.

Pete produced a flat strip steel tool and began sliding it around the crack between the door and the door frame.

"It's bearing here, and on top," he announced, marking two spots with a yellow chalk. "The concrete split out here. . . See. That your crack, Commander?"

"Looks like it," Sid said.

"Take out the hinges, huh, Pete?" Fred said. He had already made a trip to his flitter and was setting up the boxy sections of the cutting laser.

"Yeah, and a piece of frame . . . Say, what's behind here, Commander?" Pete gestured at the hinge side of the door frame. "Blank wall?"

"Yes, as far as I know," Sid said. "I'll get the walkie-talkie and ask Julie."

"Hell, the girl. I forgot," Fred said. "Pete, pound on the door and let her know we are out here."

"Here's the walkie-talkie," Captain Henery said, handing it to Sid.

Pete began to pound Morse code *R*'s on the door with a hammer from his belt kit.

Sid pressed the operate switch and Julie's voice came out of the small speaker. She sounded tired, but she was still reading off the dial numbers in an even monotone.

"Julie. Julie," Sid said into the transmitter. "This is Sid. I'm right outside the door."

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"Sid! I hear the pounding." Julie's voice went up in pitch. "Oh, Sid. Can you hear me? How are you talking to me?"

"Through the FM intercom, Julie," Sid said. "I have a walkie-talkie out here. It is tuned to your frequency and has a voice switch, too. Just wait until I stop talking and you can talk. Don't change anything on your intercom in there."

"I can hear you now, Sid. I understand."

"Good, Julie. Now listen. We are going to try to open the door. Will you tell me if the wall on the hinge side of the door. . . the hinge side. . . is clear. No cables or instrument consoles. . . Is it clear, Julie?"

"It's clear, Sid. There're about three meters of plain concrete wall."

"Very well. Now, stay away from the door and that wall. We're going to start lasering. Have to cut the hinges off the door."

"I understand. Please hurry up. It's getting hot in here."

"Hot? How?"

"I don't know how hot, Sid. There's no temperature sensor for this building." She started to giggle. "All sorts for the bore hole, but none in this room. Funny, isn't it?"

"Julie. Julie, is the heat coming from the bore hole? *Steam?*"

"Holy cow. Start the laser, Fred!" Pete jumped clear of the door.

Fred began to hurry his power-up routine. The laser beam snapped into being and the steel door began to sizzle and crack as the cutting beam went to work.

"No steam, Sid," Julie answered. "But very hot. Hot air, or just. . . heat. It has been building up slowly, but the air in here has started to condense. Everything is dripping."

"Get her out of there!" Dan Ames was suddenly standing behind Sid. He was clutching the blanket in front of him and his eyes weren't focused yet, but he *was* standing and conscious. "Get her out, Sid. The temperature will kill her. Slow heat, Sid. Got to get her out."

"Dan, hold it!" Sid grabbed him as he staggered. "We are cutting the door now. Take it easy. . . your head."

"Just dizzy . . . I'm O.K." Dan shook off Sid's hands. His voice rose to a scream. "The door slammed shut. I couldn't get it open, Sid. It kept shaking. . . shaking.

"Listen to me, Sid," he switched thought, tears streaming down his cheeks. "Julie. . . the slow heat build-up. . . Sid, that will cook her," he sobbed, choking his voice. "The snatcher belt. . . It won't sense a slow increase of heat until the total temperature is too high. If she loses consciousness now, Sid, the stupid belt will just think she is sleeping. Get her out, Sid!"

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"She's got a snatcher belt on?" Pete asked. "Then why are we cutting?"

"Keep cutting!" Dan screamed. He tore himself out of Sid's grip, fumbled at the buckle and ripped his own belt off. "Look at me. I fell down and got a knock on the head; the belt didn't jerk me out, did it? Figure it out. The belts don't work!" He collapsed suddenly and sat down, holding the belt. "The belts don't work, Sid," he sobbed softly. "There was an earthquake. . . I saw the ground split, Sid, but the belt didn't. . . Julie. . . Oh, God. Get her out, Sid. . . Her belt won't work. . ."

Captain Henery lifted him up like an empty sack and helped him back to the skimmer.

"He know what he's saying?" Fred asked. He hadn't wavered a millimeter in his lasering, but he wanted to know. "About the safety belt? That one at Site Four didn't work last night either."

"Our EDT belts are set at higher levels," Sid explained. "Our job is to ride out an earthquake in the bunker. The snatcher belt levels have to be. . ."

"Sid, how much longer?" Julie's voice asked. "It's really hot in here. If you are going to be long, I'll go back to reading the dials to Arthur. It keeps me awake and I get very sleepy."

"That's got the bottom hinge," Fred reported. "Shifting to top, now."

"The air is getting bad in there," Pete said. "Her voice sounds fuzzy. Ventilators must be out. I'll see." He disappeared around the corner of the bore shack.

"There's air coming *out* of the intake," he yelled. "She's got *pressure* inside there. I'll check the outlet duct."

"Julie, what's happening?" Sid called. "Julie? Julie?"

Julie didn't answer him. The walkie-talkie picked up her voice, but she was reading numbers. Her voice stumbled and she kept saying, "Hot, hot." She didn't seem to hear his call, but kept on reciting the dial readings.

"She can't take any more of that, Sid," Dan screamed from the flitter. "Get her out! Oh, please get her out before she goes unconscious. The heat must be horrible in there."

"They will get her out, mister," Captain Henery held Dan in the skimmer seat. "Here, put this pad on your head. It's started bleeding again."

"I could barely hold my hand in the air outlet," Pete said, scrambling back to his partner's side. "Cut it as fast as you can, Fred."

"Sid, holler at her. Wake her up!" Dan pushed Captain Henery away. The captain had put Dan's snatcher belt back on him and was trying to get the skimmer's flying harness buckled across his legs to immobilize him. Dan looked

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down at the snatcher belt, then pointed to it frantically.

"The belt!" he called hoarsely. "Make her pull the panic ring! The ring. Hurry, Sid!" He collapsed back in the seat, shoving at Captain Henery weakly.

Henery stopped fussing with Dan and turned to Sid in amazement. He knew what a panic ring was—it might work.

"Oh, for. . . I didn't think." Sid began calling into the transmitter. "Julie. Julie. Bug out! Bug out!"

The snatcher belts were equipped with a last minute safety device. They had a hand operated mode—the panic ring. The wearer could pull it and distort himself to safety at any time before the danger criteria were reached. This panic ring had a service stigma of cowardice attached to it—to bug out was not a popular sport in the Fleet—and Sid had been thinking about other means of rescue. He'd overlooked the obvious.

"Sid? What. . . you say?" Julie's voice was weak now.

"Julie. The heat build-up is too slow. Your snatcher belt won't activate. You have to do it yourself. Bug out, Julie!" Sid kept his voice level and intense. He had to drive the words through to her. "Bug out! That's an order! Julie. . ."

"Top hinge gone," Fred reported. "Got to cut the frame now. We gonna make it, Pete?"

"Keep cutting, man."

"Julie, pull the panic ring." Sid kept calling. "Pull it. Julie, can you find it? Find the panic ring, Julie. Find it."

"Sid? What do you want? . . . square ring on left side... I've got it, Sid."

"PULL IT!" Captain Henery and Dan both matched Sid's voice in the yell. Dan struggled past the captain and staggered to Sid's side. Captain Henery let him go.

"Pull it? You want me to pull it," Julie said. "All right. But get that door open soon. . . it's hot in here. Just get me out, please. I'll pull. . ."

Her voice cut off.

"Julie. Julie. Julie." Sid kept calling.

"The frame's cut," Fred hollered. "Get the wrecking bar in the top, Pete. Stand clear!"

The steel door popped out of its frame with a squeal from the torn latch and clanged on the ground.

Pete dropped the wrecking bar and jumped to grab Dan.

"Hold it, mate!" Pete said. "You jump in there from outside and your snatcher belt might work: high level or no high level. Then we'll lose you, too.

"Tell us where them dials are, huh? She'll be in front of them. Fred and me, we'll get her out."

Dan nodded. "Right wall. . . whole wall. Stay close to the walls. . ." He was about out on his feet.

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"Sure. Got it Fred: in case I don't come out fast enough?"

"Safety line, Pete." Fred clipped one end of a coil of rope to his partner's belt. "Tug and we'll pull you out."

"Just yell if you find her," Sid said. "The intercom is still on. I'll hear you."

Pete waved and stepped through the door. Fred fed the safety line in after him.

Pete hadn't been gone two seconds, when the ground rocked under their feet.

The laser cutter toppled over and Pete yelled from inside the bore shack.

Sid was concentrating on listening to Pete and forgot to time anything. The second ground jerk caught him by surprise. He dropped to a crouch and put a hand on the ground to keep from falling.

The ground was rocking back and forth. The laser equipment was making breaking noises and Sid could see ground pebbles walking their way out from under the fallen steel door.

Fred was lying flat.

Pete shouted. "The girl's not here! I'm coming out. You hear me? She's not here. Her belt worked, O.K." The panic in his voice was plain and undisguised. Sid didn't blame him. The bore shack was no place to ride out a temblor. The claustrophobia and fear generated inside the close, windowless, concrete shack would be tremendous--it was bad enough inside the bunker.

Pete staggered out of the heat and condensing vapor.

"The place is empty, Commander," he gasped. "Wow, what a ride. I've never been so scared. Was that the earthquake the grapevine said we are supposed to be waiting for?"

"Earthquake?" Dan was standing stiffly rigid, his arms at his side, with his elbows locked. His eyes were wide, his face drawn and tight. "Earthquake." He swayed a little as if remembering the ground motion. "Oh, yes. One of them," he answered. "Julie's gone. She pulled the panic ring O.K., huh?" He was looking blankly at the open door.

"That's right, Dan," Sid said. "Her snatcher belt worked and she's safe on the lifeboat satellite." He turned to Captain Henery. "Captain, I want you to get back to your landers as quick as you can. You can have your Sparks check on Julie in the lifeboat. Tell her you'll pick her up after the evacuation, though: don't make a trip until you have that lander full of men."

Captain Henery nodded. "That earthquake will help change everybody's mind about evacuation. However, that wasn't the big one you were talking about, I take it."

"No, just a foreshock. But you

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are right, everybody should be scared by now. Ramierez will be able to get most of his people aboard without panic. Load up your landers, Captain."

"Commander, what's that tube thing in there?" Pete asked suddenly.

"Huh? Oh, the borehead for a deep bore, Pete. It takes instrument leads and fiber optics down into the. . ."

"Not now. it doesn't. It's white hot and melting."

"What! The heat can't be that high. . . All we record down there is friction between rock layers. Let me see. . ."

"Stay out of there!" Dan ordered, gripping Sid's arm. His hand was a rigid claw. "What goes for my snatcher belt, goes for yours, too.

"How do you know about the heat, Sid?" he went on, his voice tight and mechanical. "Theory says friction temperatures should be building up just before a big quake. That tube is less than five kilometers from the South Fault . . . and it is a conducting tube. The heat could be anything . . . in fact it is." He let his breath out in a long sigh and seemed to shrink within himself. He pulled the blanket around his shoulders and began to shiver.

"Take me back, Sid," he said weakly. "Back to the bunker. I . . . I want . . . I need the computer. We've got to look at my prediction program. Got to look at it . . . I think it is about to zero out." His shiver got heavier, so that it was hard for him to talk. "I don't . . . think . . . we've got . . . anything like . . . ten days. Not any more." He began walking toward the skimmer. His steps were jerky, irregular.

"Neither do I, Dan," Sid said to his back. "Neither do I."

Sid swept his arm in a wave to include everybody around him. "Let's go," he said abruptly. "You've got to get off-planet. Quick.

"Captain Henery, you go back with Pete and Fred. Take the EDT skimmer, there; Dan's." Sid pointed. "You've got to move. Canis IV has had four earthquakes in as many hours; each one a little stronger. I'm too scared to worry or wait for snatcher belts any longer. General Derrick hasn't got any on-planet, so the evacuation *must* be by Fleet boat; before the quake hits hard. I want all hands off-planet and no exceptions. I am through playing around, Captain.

"Now, I am going to give you some teeth; to keep Derrick in his place, if he gives you trouble. I am formally declaring Emergency Fleet Law on Canis IV and directing an Earthquake Evacuation . . . by boat—your Fleet boats. Do you want it in writing, or will three witnesses be enough?"

"It's enough for me," Captain Henery said.

"We've worked for the Fleet be-

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fore, Commander," Pete said. "Fred and I know what you're talking about. You got your witnesses. We'll tell Ramierez; he'll log it."

"So will I," Sid said. "Tell Ramierez to start full evacuation, now. Use Fleet Directives, Captain, if General Derrick gets in your way, but fill up those landers. Get everybody off-planet. I don't want anybody left on the ground. This quake is going to be a massive earthshock. Nobody has ever heard of heat like that . . ." He gestured at the steaming bore shack. "Get going!"

"Right." Captain Henery gathered Pete with a wave. "I'll call you as soon as I check on your girl. She's all right though, don't worry."

"This laser sure isn't all right," Fred grumbled. "We'll leave it here. It's a wreck." He unhooked the power cable and threw it in the skimmer. "Take off first, Captain. Pete and I will be right behind you. We want to get evacuated."

Sid ran to his skimmer and slid in behind the controls. Dan was aboard, strapped in, so Sid took the skimmer high.

"I want to go back along the North Fault," he shouted. "See if there has been any land slip on the surface. You feel up to it? Head O.K.?"

Dan nodded. "Fly it. I'll hold together. But don't take too long."

Sid reached his altitude and began to fly west along the fault, or rather above it at three thousand meters. There was nothing abnormal visible, but he continued along the fault line. The EDT bunker was located near this fault—this course would take him home.

The skimmer's communicator began to sputter: "*Corry Ann* to EDT skimmer, come in. Official traffic. Acknowledge, please."

Dan reached for the mike, got it on the second try, punched the XMIT bar on the skimmer's transceiver panel and said, "EDT skimmer to *Corry Ann:* We hear you. Am standing by."

"*Corry Ann* to skimmer: General Derrick declared a state of emergency following a construction accident induced by pre-earthquake ground stresses. Temporary planet evacuation was ordered and is proceeding. Estimate lander loading complete in one hour. Will take off when loaded. Your EDT team planned for evacuation space on *Corry Ann.* Please expedite arrival."

Dan shook his head weakly. "Why does a radioman talk like a telegram? Just because he's being taped back at the home office," he said. "That Sparks; I heard his message, but it didn't get through. Sid, could you tell what he said. . ."

"Yeah, this one was perfectly clear," Sid said. "The general is going to take credit for saving the lives of his crew and make the

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earthquake alibi his loss in schedule time. He does things like that by instinct.

"Actually his action almost guarantees our earthquake," Sid said, grinning. "No earthquake would ever dare double-cross General Bat Derrick. But he still doesn't believe we are going to ride out the quake. Tell them to go ahead; we aren't coming."

Dan nodded and bent over the transceiver again.

"Message acknowledged: Recommend all speed on evacuation. Captain Henery returning *Corry Ann* carries full Fleet and EDT authorization." He coughed and went on: "Negative on EDT evacuation space." His voice faded out on him as he realized what he had said. His shivering began again. "Repeat: Negative EDT evacuation," he continued, strengthening his voice with an effort. "We will remain throughout quake action as planned. Contact bunker radio. Skimmer out."

"See. Talking like a radioman is easy," Sid said. "You do it by reflex." He ignored Dan's hunched, quivering figure, and concentrated on his piloting. He slanted the skimmer toward the ground. "Let's get down before the quake does hit. There is the bunker."

Sid curved the skimmer into a landing alongside the bunker and shut off the power.

Dan levered himself out and opened the bunker door. Sid let him do it by himself, but was glad to see that Dan flipped the hydraulic lock—to hold the hatch open.

"I'm not going to have a port shut on me twice," Dan said, referring to the lock. Then he stopped talking, put his head up and looked around. His shaking stopped, cut off instantly, by his alert interest.

"Sid," he said softly. "Sid, everything's gone still. . . Feel it?"

Sid, standing by the skimmer, also noticed the tension in the air. The leaves on the trees hung straight down. There was no movement in the grass clumps on the edge of the clearing. No wind; the air was absolutely still; seemed to grow heavier as he stood in it. And quiet: Canis IV had no birds, but it did have a large population of noisy insects and a chattering psuedo-squirrel—they were silent, not a chirrup or chatter.

The ground, the air, both had a feeling of stretched thickness to them. Sid even had the illusion that the yellow-brown overcast was coming down on top of him.

Then the first shock hit. *Hard.*

Sid felt the ground kick up and down under his feet.

The skimmer slammed into the side of his shoulder, jarring him. He jumped up into the skimmer's seat, to ride the shock out on the flier's landing pads.

Dan screamed and took a running dive through the open door of the bunker. Sid saw his legs and

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feet disappear over the jamb; heard him scream again. . . and again.

The second shocks hit. And with them, the sound: a roaring rumble; the airborne sound of the ground waves; the vibrating growl of the earth itself.

Sid knew his reflexes and senses were working very fast, but he also knew they were telling him about things that had happened long milliseconds before the impressions registered on his mind. Earthquakes trigger deep emotional and physical responses in human beings. When the ground moves, a man's body takes over and starts operating glands, nerves, muscles, senses, and emotions that are beyond his control. These reactions happen along defensive/survival patterns, and at speeds learned far in the past—back when man was living in a cave, on a planet made up of volcanoes and earthquakes. They are fast, these reflexes; they tend to leave the brain lagging far behind; confuse it; puzzle it; sometimes cut it completely out of the loop.

Sid knew these things: as a seismologist, part of his training had been in human reaction to earthquakes—his experiences of other quakes had taught him the unreliability of his own senses—but his brain kept on telling him what he was seeing and feeling.

The ground jerked sideways.

The bunker—its foundation pad was pulled sideways from under its unsecured mass—the bunker slid half a meter one way and back again. The edge of the bunker left long scratches—twenty centimeters or more—in the concrete. The screaming scrape of concrete added to the noise.

The skimmer also jerked along the ground, throwing Sid from side to side in the seat, and adding the sound of ripping metal—the landing pads—to the noise.

Then silence—absolute, or relative, no matter—but intense quiet.

Sid found himself sitting stiffly erect, waiting for the sound to begin again. In this attitude he heard the airborne sound waves of the earthshock's ground movement. The sound was a roaring, grinding, hiss. Sid hoped the bunker sound pickups would tape the sound; he would never be able to describe it.

The second shock wave system hit. It was a double shock, like the first.

Sid was looking toward the colony Site Two. He expected the epicenter to be there and he automatically looked in that direction in response to the sound.

The shock hit the bunker; Sid's ears told him the ground went up and down and then his sense of balance went out. He felt his eyes lose focus and he began to see the ground waves coming at him across the rising ground west of the bunker.

The ground was rippling like a

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blanket . . . moving like waves . . . P waves? No, that's what he had just felt . . . Reflected ground waves? Maybe? But mostly eye/ear illusion from a brain that was getting too many panic signals.

Sid held onto the skimmer and waited for the ground movement to stop. As soon as it was quiet he would do something about getting inside the bunker. Inside, where the visual effects wouldn't be so great. Besides, he wanted to see the instruments—watch the aftershock activity . . .

The silence returned. The quaking stopped.

He climbed out of the skimmer carefully. His balance was still distorted—he didn't want to fall. He managed a slow walk across to the door, although he suspected it was more of a stagger than he wanted to think about.

The temblor activity seemed to have stopped. At least he couldn't feel anything.

The bunker foundation was still in good shape . . . No serious cracks. There was some spalling where the shock waves had reflected off the surface. The other side—away from the wave action—would be worse, but spalling wasn't serious.

The scratch marks showed the bunker's floating design was a good one. Those marks would have to be photographed later on . . .

Sid was inside, bracing himself against the corridor walls. He'd made it. He punched the door controls: they worked and the door closed, sealing the bunker.

Arthur was the first to notice him. He looked up from tightening the seat belts across the shoulders of Dan. Dan was breathing—unconscious, but breathing—and strapped into a control chair. Arthur lifted his hand in a mock salute.

"Our smiling commander has returned," he said brightly, but his eyes were hard and he shook his head slightly to tell Sid about Dan's condition. "Get a picture of him, Lorraine," he went on. "He has been working too hard . . . working to stand up, looks like."

Lorraine turned. She held a narco-spray tube in her hand and her eyes were bright, moist and not far from panic. Sid decided that any sympathy now might push her over the edge. The EDT remedy for earthquake panic was overwork—routine, and lots of it.

"Take your chairs please," he said. His voice wasn't as firm as he'd like it to be, but . . . "Rack that narco-rod, Miss DeStamm and take your station. You are not safe out of the control chairs."

Sid made his way to his station and sank onto the chair. "Art, check Dan's snatcher belt, will you? He had it off once. Make sure it's secure and powered, please."

"Right." Arthur looked, nodded O.K. and strapped himself into his own chair.

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Sid tightened his shoulder harness to help himself sit straight. His ears were still bothering his balance. He was glad Arthur had deployed the control chairs—even though he had expected the action—SOP.

"Did everything ride out the temblor?" he asked. "Any breakage, Lorraine?"

"Nothing," she answered. "They have all been smallish shocks, except the last. It went to 7.3."

Arthur punched a display and showed a seismograph pulse on the computer screen. "This is our local seismograph," he said. "I'm using it as a visual reference. The rest of the seismos are coupled directly into the computer telemetry net." He touched another control. "This is the real time trace, Sid. Looks as if we might be going to have a lull."

The trace on the screen was showing the bunker's seismograph as it was recording at the present moment. The trace was even and regular with none of the wide swings produced by the quake waves.

"I hope so," Sid said. "EDT put this station down here to record earthquake data, but this is getting ridiculous. What is it now, five quakes? We have enough data for ten years of work, just reducing data. And it's a near quake, too. Too bad we don't have another station about a thousand kilometers away. Then we could really make some good use of the data . . ." He broke off to ask a question. "Lorraine, what about Julie's gravity recorders?"

"They seem to be working, Sid," she answered, "I don't know her specialty enough to read the tapes, but everything recorded. I checked that.

"That is, they were recording up to that last twitch, just before you came in. Then everything went off. I think the big gravity weight broke loose, or fell down."

"Very likely," Sid nodded. "Well, Julie will be able to make sense out of the data when she gets back down . . ."

"Oh! Lifeboat?" Lorraine gasped. She hadn't let herself think about Julie. The way Dan had come back . . . "Oh, Sid. She's all right? Really?"

"Yes. I think so," Sid was programming his computer terminal. "I had her pull the panic ring . . . on her belt. She should be safe and happy in orbit, but missing all this fun down here. Captain Henery is going to check for me, but I don't expect to hear from him right away. He'll be busier than fleas, with the evacuation—if he got off at all."

"You want me to monitor the radio?" Lorraine asked.

"No. Let's get this data into the computer. This is an EDT team, remember . . . and this lull won't last forever. Dig in, troops."

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They began to work. The bunker had been designed so that the control consoles were in reach of the chairs and everybody stayed strapped in.

Two of the seismographs rang an end-of-paper alarm and Arthur left his seat to change recorder rolls, but he unstrapped cautiously and hurried back.

The lull went on.

"Sid," Lorraine called. "Look at this! The microseism pattern is suddenly bunched. Have you ever seen anything like it?"

Sid leaned over to look at her screen. "Oh, yes. I think so. Arthur, do you have a short period seismo near the landing field?"

"No, not close. The landers coming in and out would make hash out of it . . . Oh! I get you. Let me look at WF12C . . . it should . . ."

A seismograph trace came on his screen. "What's the time hack on your burst, Lorraine?" He leaned across to read it for himself. ". . . yes, look there. Two nice squiggles, Sid . . .

"Captain Henery took off with the work crew. Those are lander blast shocks, Skipper. No doubt, huh?"

"Not much, Arthur. I'd like to get him on the radio, but I don't know about leaving here." Sid grinned. "How many more aftershocks do you expect, Arthur? Have you run out the prediction equations for them yet?"

"Aftershocks? Those jerks we felt were all foreshocks, Sid. The big strain hasn't let go yet."

"Wha-a-t?"

"That's right, Skipper. The tilt compression is still in. The program shows the tilt meters all rocked back to zero, but they haven't unloaded—switched orientation the way they do when the strain relaxes. We're still waiting for Mister Big."

The computer lit up a red warning light: displayed a seismograph trace.

"Arthur," Lorraine yelped. "Look!"

"I see. I see," Arthur chimed in. "There's a P wave bigger than the rest: I set a limit alarm." Arthur was checking displayed location numbers. "That's a station close in to our predicted epicenter, Sid. Almost off scale . . . This may be it."

The bunker rose and fell. Riding with the motion in the control seat, Sid felt the wave; like a pitching boat.

The bunker jerked, throwing Sid forward against the belts. A grinding roar of sound shook the air and turned into a deafening crash.

A block of gray-yellow granite drove up through the foundation and cut into the end of the bunker.

The block's upthrusting energy was so high, so violent, that the inertia of the bunker caused the granite to slice through the concrete and steel with freakish speed.

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Sid saw the end of the bunker almost instantly replaced by the granite plinth. He saw its dappled surface in fantastic detail.

His body snapped against the restraining straps and his sight went red with the G-loading, then snapped to black, shot with gold specks.

His snatcher belt hit its safety margins and activated.

Sid's next impression was a dull pain in his shoulder, a sting across his thighs—from the belt harness—and the nausea: the wonderful, welcome sickness of weightlessness.

He was inside the EDT lifeboat.

All of the planning, the training, the design of the bunker; all had been frustrated by the unknowable violence of Canis IV's ground energy and a hidden fault. Canis IV had thrown them off; shaken them out into space like bothersome insects. Now, Canis IV was having its earthquake in solitary violence, watched only by the instruments in the bunker that were armored enough to survive.

"Everybody here?" Arthur asked. "Julie? Lorraine? Did Dan make it O.K.?"

Sid opened his eyes and saw Julie—blond, slightly smudged and beautiful—drifting over his head against the padded wall of the lifeboat receiving chamber.

"Julie!" he said. "Didn't know for sure if you made it. Hi!"

"What hit us?" Arthur asked. "We were supposed to ride out any earthquake. That bunker was built . . ."

"The whole end of the bunker was gone," Lorraine's voice was quavery. "Some kind of massive faulting and upthrust—right under the bunker. I can still see the afterimage—all rock. Oh, Sid, I'm so sorry. It looks like the Thomas Site is going to become notorious after all."

Sid shook his head, not trusting his voice further. The earthquake—*their earthquake*—was being recorded: on full automatic. Notorious? No, hardly. This was just a big quake. The Thomas Site would probably never feel another one as big. The crust movement would be smooth and stable for fifty or sixty years.

Later, they could go back down, salvage the data, rebuild the bunker and have good, solid information for the next EDT station on the planet . . . And for Derrick's rebuilding program, too.

No, the job wasn't a complete botch. The team should have ridden out the quake . . . but . . . Well, the whole team *was* safe, sidetracked, out of action, but safe . . .

"Signal for Captain Henery," he managed. "It's all over."

"And I missed it," Julie said. "Somehow I never seem to get the big tremors. Someday, I'd like to feel a big one."

Arthur got the hiccups. ■

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Clarke's Third Law states that a sufficiently advanced technology always seems like magic. Now, how do you go about the orderly scientific study of "magic"?

JAMES BENJAMIN BEAL

"There is a principle which is proof against all argument, and which cannot fail to keep a man in everlasting ignorance. That principle is—*Condemnation before Investigation.*" —Herbert Spencer

At the end of the last century, Wien advised Planck to become a pianist, rather than a physicist, because physics was a closed subject. Less than a hundred years ago, an American newspaper carried an editorial condemning a man who had been arrested because he "claimed he was promoting a device whereby one person could talk to another several miles away, by means of a small apparatus and some wire." Quoting from this editorial in his paper, "Dowsing in the Space-Age," Rolf Schaffranke, research consultant, points out what every schoolboy today knows: in 1876 Alexander Graham Bell patented the telephone.

With monotonous regularity, apparently competent men have laid down the law about what is technically possible or impossible—and have been proved utterly wrong, sometimes while the ink was scarcely dry from their pens. "They said it couldn't be done" is a phrase that occurs throughout the history of invention; I do not know if anyone has ever looked into the reason why "they" said so, often with quite unnecessary emotional overtones. Was a sense of security threatened?

If so, "they" had better be prepared. There is much new physics to be discovered, not the least of which will occur in the field of paraphysics. Right now, in laboratories here and in the U.S.S.R., scientists are exploring the physical bases of psychic phenomena. Telepathy, psychokinesis, aura—all that "parapsychological nonsense" of today—are, as every science-fiction buff can tell you, likely to be the scientific discoveries of tomorrow.

The human brain is the most complicated structure in the known universe—but as practically nothing of the universe is known, it is

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paraphysics and parapsychology

probably fairly low in the scale of organic computers. Nevertheless, it contains powers and potentialities still largely untapped, and perhaps unguessed at. As Arthur C. Clarke points out in "Profiles of the Future," probably ninety-nine percent of human ability has been wholly wasted; even today, those of us who consider ourselves cultured and educated operate for most of our time as automatic machines, and glimpse the profounder resources of our minds only once or twice in a lifetime.

When that percentage is finally whittled down, it's likely to be physicists rather than fakirs--or pianists--who'll deserve credit for showing us how those resources can be mined.

Until comparatively recently (the 1950's) biologists regarded a cell as a minute bag of fluid that is relatively simple in structure. But under the electron microscope, cells were seen to be exceedingly complex. What earlier seemed to be a "simple cell wall" is likely to be folded and convoluted—precisely the right kind of structure to serve as a semiconductor. And components of the cell are likely to include organic semiconductors in the form of liquid crystals--a material that is hypersensitive to temperature changes, magnetic and electric fields, stress, radiation, and trace contamination. To complicate matters even more, many cells have a double outer membrane; electrically, such a membrane functions as a capacitor with the characteristics of a leaky dielectric.[1] It should also be noted that at low frequencies the permeability of the cell membrane to ions is enhanced, thus promoting electrochemical interactions. Nerves and muscles are also accompanied by electrical activity involving flow of ionic currents.

Viewed as a minute but extremely elaborate electrical system, the living cell (like all electrical systems) is obviously subject to the influence of magnetic and electric fields. And these fields may induce not just one but a complex system

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of electrochemical events. Small wonder, therefore, that reported field effects at the cellular level are diverse and debatable: effects will depend upon the components of the system and its organization.

More easily detectable are the field effects at higher levels. There are transient magnetic fields surrounding the human torso which are related to the well-known electrocardiogram (EKG), and there are varying magnetic fields surrounding the human skull associated with the brain's electrical activity. Regular magnetic field fluctuations in the vicinity of the human chest relating to EKG patterns have a magnitude of 10^{-8} to 10^{-7} Gauss, which is about 10^{-7} of the steady component of the earth's field.[2] (There is a lot of 60-cycle noise in our environment too, so the living system or person should preferably be tested in a room magnetically shielded by Moly-Permalloy or its equivalent which essentially forms a Faraday cage to eliminate electrical interference as well.) Based on our experience with EKG and EEG patterns, it's certainly reasonable to assume that refined detection of minute magnetic fields that accompany biological activity may lead to interesting and useful applications in the future.

Dr. Barnothy, physicist at the University of Illinois Medical Center, has performed some interesting experiments along these lines using mice in magnetic fields. Aging effects can be retarded on exposure to 4,200 Oersted magnetic field intensity for a few months when the mouse is very young; however, exposure to 9,000 Oersted field produced adrenal gland abnormalities and shortened life expectancy.[3] Dr. Kolin, professor of biophysics at U.C.L.A., got approximately the same effects on fruit flies, that is, alteration of development time to death effects. Fertility and longevity characteristics were affected and extended into inheritable traits of longer duration lasting for up to thirty generations. These changes were explained by the effects on free radicals where magnetic fields alter probability of chemical/electrical interactions.[4] A tie-in here should be made with some of the work that Dr. Shafer, formerly of General Dynamics Life Sciences, has done with mice inoculated with virulent lymphatic cancer, then exposed to a high negative ion field (negative ions could be considered "supercharged" oxygen atoms with a surplus of electrons looking for chemical reactions to stimulate). Dr. Shafer got the same results as Dr. Barnothy . . . a slowing down of cancer spread, some complete remissions, some holding constant. Lifespan was greater than in other mice remaining as a control group outside the charged ion environment.

It appears that similar results are obtained where a DC electrostatic field (positive) or an ion-charged

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volume (negative ions) are used. In both cases chemical/electrical interactions are enhanced. For control of environment to produce the maximum physiological benefit without danger of "overloading" the body circuits, the best bet appears to be a positive electrostatic field, generally not exceeding +15,000 volts per meter at head level. A positive field serves to eliminate boredom fatigue, improve efficiency, and provide better visual brightness discrimination. As indicated in NASA TMX-64549, "Atmospheric Criteria Guide-Lines," the earth's natural field at the surface is usually positive, ranging from a few hundred V/m to a maximum of +15,000 V/m, and decreasing in positive potential with altitude during fine weather. When clouds develop the potential gradient increases. Inside metal-frame buildings, automobiles, airplanes or any structure surrounded by metal the earth electrostatic field is zero . . . a natural Faraday Cage is produced.[5,6] Indeed, the extensive use of plastics (almost all have a high *negative* electrostatic field) inside of buildings and vehicles can provide a strong negative field which augments fatigue, irritability, and natural apathy. (This statement leads to an intriguing question: Are we also electrically polluting our environment? This seems a distinct possibility. Have you noticed how some plastic-containing clothing sticks to your body in dry weather? The body field is positive and the plastic is negative, thus creating this uncomfortable effect. Polyesters, nylons, and vinyls are generally positive, thus they "feel" better on the body.)

Feasibility experiments were conducted by this author on the effects of a +60,000 V/m electrostatic field on ESP card guessing experiments–the guessing of the order of the cards (25 cards, five symbols repeated five times each) after shuffling and placing back in their box. It was assumed that the equipment would improve the statistical results of a large series of card guesses, using the "Down Through-Clairvoyance" test. The +1,500 volt output disk was placed one inch (0.0254m) above the experimenter's head and a series of 1250 trials performed for each condition of equipment on and equipment off. The average of correct hits was plotted for each group of 250 trials (10 card deck runs), giving five points to plot. With the equipment off the author scored a probability of 7 in 1,000 and 1 in 1,000; with the equipment *on* the results *were not significant.* (The second series of trials were accomplished by alternating equipment on and off for each 10 card deck runs, then separating the "on's" from the "off's.") These were not the results expected! But a result seemed evident of equipment influence. (See Figures 1 and 2.)

These tests were performed in

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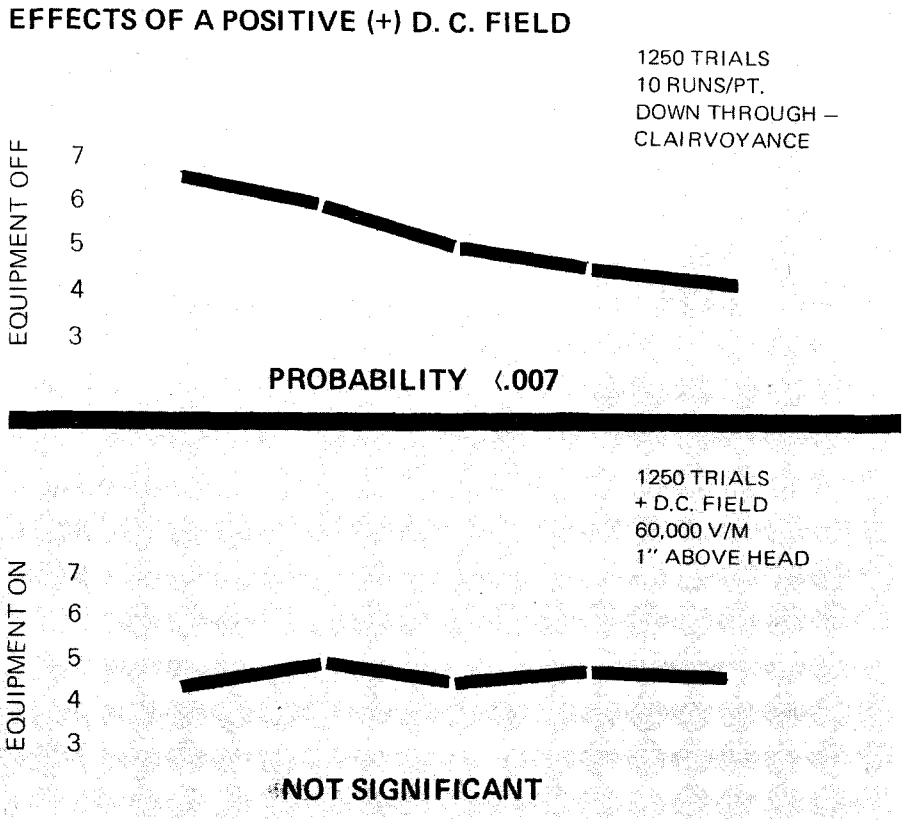

FIGURE 1

1969; no attempts were made to monitor brainwave or heartbeat frequencies or control possible influences of weather and earth field effects, thus these tests only show feasibility and further investigations must be made in more controlled conditions. Information that became available after this experiment was conducted shows that effects of fields on brainwave activity are definite: depending on conditions, intensity, frequency, and location of radiating antenna, brainwave frequency will be increased or decreased.[7,8]

Since beta wave activity of the brain (above 14 cycles/second) is associated with an awake, alert physiological condition and alpha wave activity (8 to 14 c/s) with introspective, concentrative and

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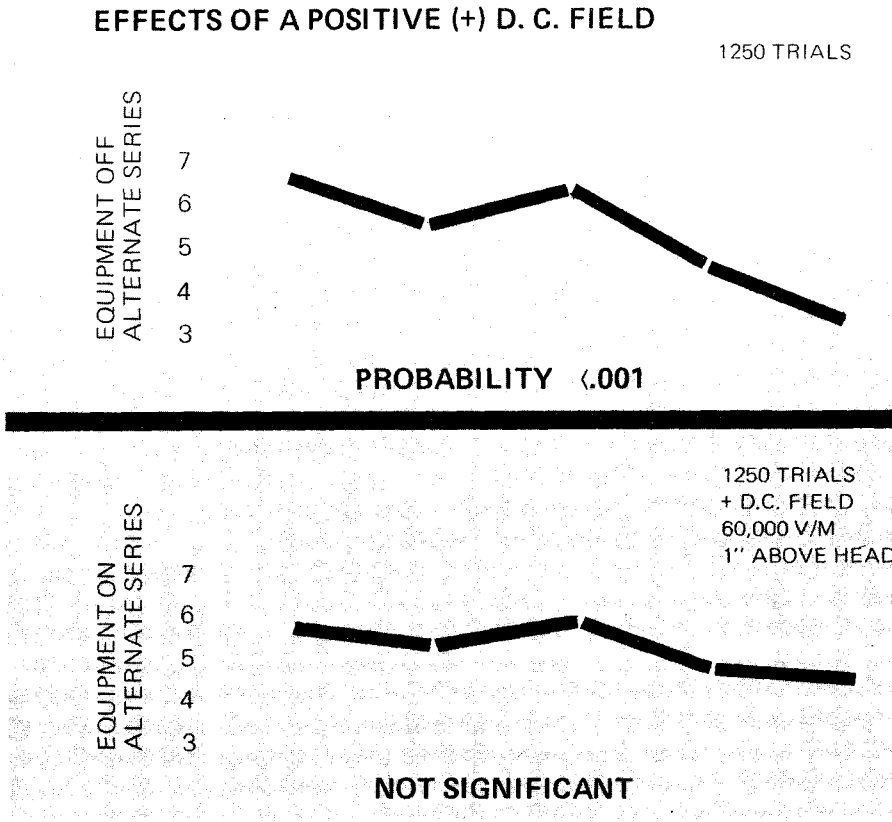

FIGURE 2

dream states, it is here assumed that a high-intensity electrostatic field enhances beta and decreases alpha production of the brain. Recent parapsychological studies indicate the association of the alpha brainwave frequency with increased psychic abilities. Based on these assumptions, it seems that the use of a high intensity electrostatic field has generally beneficial effects on active processes of the brain and body, but suppresses the clairvoyant psychic effect . . . to enhance psychic conditions it may be necessary to use a negative field. (The author also did some experiments with plants using the same equipment. A four-day earlier germination resulted for the plants under the radiating antenna, compared to the control group. You

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can build your own positive field equipment, for experimental purposes, from old TV set parts . . . see page 70 of *Popular Electronics* for February 1971.)

The earth's electrostatic field is a natural electric force (positive) keeping the natural negatively-charged oxygen ions on the move and producing beneficial physiological effects in living organisms and to which man has, over the millions of years, adapted himself. Indeed, his evolution (and that of other living systems) has undoubtedly taken this natural effect into account. Conducted experiments and investigations suggest that the electric field produces electrical current in the body which excites the entire organism and its nervous system, and which, in turn, increases the nerve impulse rate to the center of the brain, thus making one more wakeful and aware. In connection with this, an interesting earth field effect perceived by animals is the earthquake alarm. An earthquake causes a drastic change in the earth's magnetic and electric fields. This field change is of a characteristic "signature" pattern and propagates at the speed of light, while the earthquake travels at about the speed of sound, or slower; hence, the animals sense a sudden change in the usually stable or slowly changing environment and are alerted, nervous and prepared for danger.

The magnetic field of the earth averages about 0.5 Gauss and has a particular configuration, intensity and mode of behavior peculiar to it. It is subject to continuous pulsations of low magnitude at frequencies ranging from 0.1 to 100 cycles per second, with the major components at about 8 to 16 cycles per second, *peaking around 10 cycles per second.* It is interesting to note that the average frequencies of brainwaves, as manifested by the typical 7- to 13-cycle alpha pattern recorded on electroencephalograms (EEG) fall precisely in this range, and, indeed, a relationship between these phenomena has been more than once suggested. This falls into the area of biological entrainment of the human brain by low frequency radiation.[9,10] Note that certain light and sound frequencies can trigger epileptic fits, induce hypnosis and cause sickness. The step from external sensory stimuli to subconscious electromagnetic stimuli in entraining cerebral rhythms is not a radical concept.[11] It's fast approaching reality with such goodies as medical equipment for treatment of nerve deafness now in the developmental stages by two companies (Laser Sound System and Intelectron Corp.) here in the United States. The equipment being developed stimulates hearing electrically via disk-shaped transmitter plates placed near the central nervous system; no eardrum and inner ear required.

For more than a century there

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have been sporadic reports of "hearing" aurora displays and meteors, and more recently, radar microwave. Since meteors travel far faster than sound, these reports have in the past been dismissed as unfounded. Present theories, however, support the view that some persons hear the electromagnetic field created.

For example, one woman was hearing the AC field from ungrounded motors, electric lights, telephone and Morse Code from a long-wave, low-frequency station nearby. Grounding out all electrical equipment, using three wires or shielding, eliminated most of the noise, except the noise emanating from the water faucets! A nonmetal connector in the pipe system fixed that. She could even hear the telephone become active before it rang! Her sensitivity to electric fields was extensively checked out with electrometers and field meters. This woman was lucky that her problem was identified and corrected. How many people are now in mental institutions because they are afflicted with hypersensitivity to electric fields . . . they hear voices, buzzing sounds, strange signals that those with normal hearing cannot perceive? There may be a connection here to Russian experiments which indicate that the most sensitive area of the brain to electromagnetic fields is the hypothalamus. Damage to the hypothalamus can increase the sensitivity to field changes many times over.[12-15]

Back about 1850, in Germany, Reichenbach discovered that ill "sensitives" could both feel the proximity of and describe the visual appearance of the magnetic field around strong permanent magnets. A bar magnet at 60 cycles and 8,700 Gauss magnetic flux density held to the temple gives rise to intense light sensation in perfect darkness as well as in a brightly lit room. This is called the magnetic phosphene effect, and was first observed in 1896. No one has a reasonable explanation why, but it is known that a person under hypnosis, or in a state of Mescalin intoxication, can often perceive a static magnetic field—through modification of visual images. A flicker effect is associated with a varying field. These may be potential clues for electronic stimulation (or simulation) of vision.

Electrosleep and electroanesthesia have been widely accepted in clinical and surgical practice in the U.S.S.R. for over ten years. To this day there is no clear-cut explanation of exactly how it works. The application of rhythmic, low-power, low-frequency (100 cycle) current pulses to a patient's head produces a pleasant, relaxing effect, and depending on power used, can put you to sleep gradually, in the case of insomnia, or rapidly for anesthesia purposes. (Circuit diagrams are available if you want to build equipment such as this . . .

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or you can order an already-built transistorized model from Japan.)

These are just a few of the electromagnetic effects (inputs) on the human body and other living systems. What about the outputs?

Dr. W. A. Shafer has a capacitance-type of sensor hooked into some super-sensitive electronic devices called field effect transistors (FET). He can pick up acceptable heartbeat signals over four feet from the body with his Field Effect Monitor (now on the market), and hopes to monitor brainwave signals noncontact by changing a few elements of his filter circuit. (The Russians have been doing some noncontact measuring also, for some years.) The equipment Dr. Shafer uses is of a general nature designed to respond to cyclic changes such as heartbeat and brainwaves. Specialized laboratory electrometers, or field intensity meters utilizing a field mill rotating "chopper," pick up electrostatic fields around the body and have some interesting uses to be described later.[16,17] (You can build and experiment with a somewhat similar instrument known as the "Amazing People Detector" described in the June 1968 issue of *Popular Electronics*.)

What does all of this have to do with parapsychology? Well, it appears that *some* areas can be lifted from the metaphysical into the physical world, now that we have, or are developing, suitable electronic analysis equipment that can do so. Parapsychological occurrences are admittedly difficult to analyze logically, or even to describe, because so much of what goes on in the mind is experiential and not subject to experimental analysis. Did you ever try to describe an emotion to someone? Or vision to a blind person? If you did, the best you'd probably get would be an analogy to something else, which is poor communication and extremely subject to distortion. However, the way to learn something is to try and see if it exists. When someone theorizes a new nuclear particle that nobody's ever seen, heard of, or suspected—gigavolt particle accelerators are fired up, massive hydrogen bubble chambers are activated, and 100,000 photographs are taken. Computers are programmed to search all the plates seeking the proposed behavior pattern. The physicists say, in effect, "If such a particle exists, then it should have these properties . . ." and make a test to see. It's time for the parapsychologists to do the same thing on psi phenomena, using some of the ultrasensitive testing equipment now available.

In this regard, the Russians seem to be doing more than we are. In Russia, and in Europe, there is quite a bit of work going on to test the effects of electromagnetic and magnetic fields on the central ner-

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vous system; also bioelectric and biomagnetic effects around the human body during certain types of parapsychological phenomena are being observed, tested, and measured. The Russian research in parapsychology and paraphysics is often well hidden, however, under such titles as "biological radio communication," "the problem of information transmission," "perception of space effects," "meteorological feeling," "generic memory," et cetera. Or perhaps these titles merely serve to indicate their more productive attitude toward parapsychological occurrences as fit subjects for experimentation, rather than subjects to be merely debated as to the possibility of their existence.

For example, in *Foreign Science Bulletin* and other publications it is claimed that the Russians have:

1. Established several research centers specializing in biological radio communication (telepathy) experiments on an academic and scientific level.

2. Organized teams of scientists—physiologists, physicists, psychologists, mathematicians, cyberneticists, neurologists, and electronic engineers—to investigate telepathy (TP), how it works, and devise applications.

3. Conducted experiments involving long-range thought transference—Leningrad to Moscow (600 km) and Moscow to Tomsk (4,000 km). The technique involved utilized light hypnosis of both sender and receiver and transmittal by the sender of the highly charged hallucinated emotional signal that he was physically beating up his friend (the receiver, who was 4,000 km away). The Russians claim the same brainwave form was transmitted from sender to receiver, but interpretation by the receiver of the message was not reliable.

TP information transmittal characteristics were:

1. The rate of telepathic information transmission varies between 0.005 and 0.1 bit/second.

2. The rate of info transmission depends upon distance of travel, ranging from 0.1 bit/sec for several meters to 0.001 bit/sec for 4,000 km.

3. In telecommunication normally only qualitative symptoms eliciting some kind of sensation (shape, color, hardness, et cetera) are perceived.

4. Best perception of TP info occurs when the messages are short (up to one minute). Transmission of simple, relatively brief, coded combinations of elements, image, emotion, et cetera, appears to be the proper way of handling TP information.[18,19]

I. M. Kogan, an active member of the Scientific and Technical Society of Radio Engineering and Telecommunications, gave a report on July 3, 1965, at a meeting of the Bionics Department of the Presidium of the Academy of Sciences.

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He indicated that work on TP is advancing by use of communication theory techniques and by assuming in calculations that a magnetic field generated by biocurrents is the carrier of TP information. From approximately thirty TP observations and experiments, Kogan concluded that, in principle, transmission of TP information by means of a field generated by biocurrents is possible at any distance and this distance increases with decreasing rates of information transmission. TP transmission of info can occur over short distances of one to four meters in the extremely low frequency band. Kogan states that the existence of TP is beyond doubt and there are three possible explanations for it:

1. Random coincidence.

2. Information transmitted via unknown superhigh sensitivity of the known existing sensory organs by means of their intrinsic characteristics (subsensory perception).

3. Information transmitted by presently unknown sensory organs or via characteristics that are not intrinsic to these organs (extrasensory perception).

Recently, in this country and abroad, computer analysis has been tried in attempts to verify telepathy. Experimenters assumed that "If telepathy exists, then it should have these properties . . ." and set up the computer program to check it out. Their interesting postulate was, "Assume telepathy is a communication channel with a very high noise level, so high that nearly all messages are drowned in random noise." Now, if that were true, then Information Theory can be applied; techniques for getting high reliability of communication, despite high noise levels, are well worked out mathematically. They define precise methods for the application of redundant message repetition, message inversion, et cetera, needed to get an assigned degree of reliability. Telepathy experiments were set up with two operators sending binary-coded messages back and forth, with a computer observing, recording, and calculating the necessary formulas. Positive results were obtained in both cases referenced herein.[20,21] Several drawbacks exist however, such as time (several months), finding suitable patient subjects, funding, and expensive equipment; so, applications may come slowly.

Our Russian friends have also done some interesting work in the area of psychokinesis (PK). PK is defined as the direct influence of the mind on matter—which can be in static, moving or living systems.

The following excerpts are quoted from a letter to Dr. Rhine by Sheila Ostrander and Lynn Schroeder, who traveled about Russia in 1968 specifically gathering data on Russian work in parapsychology and allied areas, in order to write a book on the subject,

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"Psychic Discoveries Behind the Iron Curtain." The letter accompanied a Russian film clipping of the controversial PK subject Nelya Mikhailova.

". . . *Notes on Investigation of Nelya Mikhailova*—Prior to a demonstration of PK effects she is thoroughly examined by a doctor and double-checked by x-ray . . . she affects a compass needle inside of a plastic case on a leather strap . . . sometimes takes two to four hours to rev up enough energy to make the needle turn . . . during filmed demonstration it took about 20 minutes . . . intense strain . . . heartbeat to 250 beats/minute . . . compass needle begins to turn, then entire compass turns, usually counterclockwise and spins like a top. Mikhailova can move various nonmagnetic objects outside of or inside of a transparent plastic box . . . can move one match out of a group by focusing energy where she looks . . . weather affects her ability . . . most favorable time for PK is when magnetic disturbances of the earth occur with sun spot activity. Mikhailova has lost as much as three pounds of weight during thirty minutes of testing . . . quite often physically ill afterwards . . . effects achieved from a few inches away to six feet . . . affected strongly by empathy of group she is with . . . has stopped and started the pendulum of a clock, moved metals and nonmetals and divided smoke inside a glass belljar! . . . She is being thoroughly investigated by Dr. Sergeev, Leningrad neurophysiologist. Sergeev has a detector which functions at a distance of several yards from the subject's body which detects electrostatic and magnetic fields . . . tests are run in an insulated EEG chamber (Faraday cage?). Registration is by electroencephalograph (EEG), electrocardiograph (EKG), and the Sergeev detectors. It seems that the occipital lobe of the brain produces three or four times more electrical output than the front of the brain in normal persons. Mikhailova's brain registers *fifty times* more electrical discharge from the back of the head than the front. The magnetic flux density around her body is only ten times weaker than the magnetic flux of the earth (approximately 0.5 Gauss), thus her body field is about 0.05 Gauss, when the normal person has a body field of 10^{-7} to 10^{-8} Gauss. Attempts by Mikhailova to rev up PK stimulates the occipital lobe and the reticular formation (interstitial tissue composed of reticulum cells forming intricate network through other tissue). This creates a polarization of energy in the brain between the front and the back. When the gradient between front

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and back of the brain reaches a certain level, the detectors begin to register electrostatic and magnetic field activity at a distance. When objects moved, the detectors showed a peak in the graphs . . . according to Sergeev a sort of wave motion or "wave of energy" was set up in the electrostatic and magnetic fields around her. Fluctuations in the field correlated with brainwave activity . . . more energy registered at a distance from her than on the surface of her head. Heartbeat increased four times over its normal rate and the pulse was associated with brain rhythms and magnetic fields several yards away from her. The energy field created is concentrated in the direction of visual focus and is consciously controlled. During PK the disturbance of the magnetic fields is of a stoichiastical character and has a parametrical resonance on a frequency of five cycles. Sergeev's own theory of PK is based on the model of unhomogeneous plasma. There are 46 other scientific films on Mikhailova. To discover potential psychics, the Soviets are testing for the 50 to 1 difference in electrical potential between frontal and occipital lobes of the brain . . . about 7% of persons tested out of hundreds of volunteers have this brain pattern . . . also experimenting with artificial magnetic fields, both static and fluctuating for TP enhancement and have had good results according to reports."

Reflecting on these statements by Ostrander and Schroeder, it seems somewhat irrelevant to debate whether Mikhailova has genuine PK abilities or is a fraud . . . the important thing is the instrumentation used and the results, which should be verifiable by independent investigators. (However, the above statements will probably be subject to a strong "snicker" effect, and the "condemnation before investigation" syndrome.)

Meanwhile, some interesting work has been reported on the dowsing phenomenon . . . also known as water witching, pipe locating, radiesthesia, or biophysical effects method. One of the noted authorities in the field of radiesthesia is Professor Rocard. In the July 1964 issue of *Physics Today,* Professor Rocard's test setup was described: a rectangular coil, 0.5 m x 1.0 m, through which a current is sent to get a known magnetic field, four milligauss (0.004) at the center. At a distance of one meter a "detector" tells whether or not the coil is activated. This may not seem so unusual, except for the "detector," which is a human subject. Says *Physics Today:*

". . . In sum, Professor Rocard gives his evidence that a significant fraction of people *can be trained* to move in a magnetic field and by proper manipulation

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of a forked stick, detect spatial inhomogeneities of the order of one milligauss (0.001) per meter. The connection with dowsing is through the magnetic fields set up by electrofiltration currents, a phenomenon familiar to the physical chemist. The last link in the scientific chain, namely, identifying the detecting mechanism in the body, remains to be forged. Professor Rocard wonders if nuclear magnetic resonance can be the physical basis. Nothing whatsoever of the occult exists in Rocard's approach . . ."

Psychometry is defined as the divination of facts about an object or its owner through contact with, or proximity to, the object. This provides a tie-in with a brief discussion of what could be called "psychotronic machines." Pipe locators, dowsing rods, and more complicated machines of like nature, such as the Hieronymus machine, Abrams' Box, or the Pavlita psychotronic generators, are good examples. Rather than go into a lot of detail about these devices and their analytical capabilities (or lack thereof!) it is easier to explain that these machines seem to require the man-machine relationship (where the human body is part of the circuit), involve variations in the sense of touch and seem to act primarily as either amplifiers, antennas, or psychological transfer mechanisms. These machines perform no understood function by themselves, based on our present understanding in physics. They appear to have been developed over the years by their inventors in a deductive fashion and definite relationships seem to exist between shape, materials used, texture, arrangement of components, and size of components. Persons involved in using this equipment appear to act as receivers of information on the subconscious level, and the equipment may, or may not, perform as some sort of amplifier/antenna. However, in these days of science and gadget-worship it is easy to blame something not understood on a machine because such talents are "impossible" from ordinary human beings due to culture conditioning. These machines may also serve as psi "talent filters," since psi appears to be a talent latent in many persons and the equipment mentioned above seems to work best for the person who is most "tuned in."

O.K., now let's indulge in some more "constraint-removal analysis" in so-called metaphysical areas. How about the controversial phenomenon known as "human aura"? Some of the not-so-impossible universes postulated in a constraint-removal analysis may never turn into reality. But to the extent that we develop a capacity to think in terms of alternate realities, we also learn to innovate. So, let's define "aura" as a distinctive atmosphere surrounding a person. Those per-

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sons who claim to perceive this phenomenon visualize it in shades of gray or colors which indicate physical and mental conditions and interactions. Aura may eventually be revealed to be a type of biological electromagnetic field radiation, like the thermal radiation patterns now seen with infrared equipment, in color if desired, on the human body.

Intensities in the biological electrical field can now be picked up by suitable instruments and recorded in shades of gray or color. Further work remains to be done toward interpretation of received data. Detection and interpretation of biological electrical field radiation is reported to be under intensive investigation in Russia for both bio-med and parapsychological evaluations. Equipment described has the same apparent characteristics as laboratory electrometers equipped with a field mill "chopper." The equipment will detect and amplify minute electrical and electrostatic fields inherent in nonconductors (plastics and insulators), and traveling through conductors (metals). The fields can be detected, the field strength determined in volts per meter, and the polarity of positive or negative established.[22] The equipment output can be fed into a conventional "X-Y" area scanning recorder to produce a two-dimensional plan view of the electrical or electrostatic field potentials around the object or person. Variations in the shades of gray or color on the recording indicate the intensity of the field in volts per meter. It should be noted that the recent application of infrared equipment and heat-sensitive liquid crystals to the analysis of body pathological conditions have yielded color read-outs of much value to the medical profession.

There is no doubt that a need exists to obtain new forms of physiological and psychological data without the necessity of restraining the subject either by sensors, wires, or rigid confinement. Recording and control of environmental factors to constant levels are also required so that the very minute signals of interest can be sifted from all the internal, external and emotional "noise" present. The results of such testing would add considerably to knowledge in the field of communications, the nature of living systems and mental processes, and might solve some of the effects data that have been randomly plaguing the human race for millennia disguised as folklore, superstition, magic, or faulty observation.

There is much interest among aerospace engineers and space-oriented personnel in the technological and academic approach to the study of parapsychology. Many of them have seen so many "extrapolated" predictions prove factual! The "impossible dreams"

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of forty years ago, spacecraft, man in space, communication satellites, and lasers, for example, have come true and expanded the imagination of those involved. Perhaps now will come a pause to think and look inward (now that we can get off the Earth, look back, and say, "I wonder if there is intelligent life there?"). We're getting the tools to start the research into "inner space" . . . this new area of understanding self and the holistic nature of man—mind, body, and environmental interactions. Anybody ready to extend the limits of the possible?

ABOUT THE AUTHOR

James Benjamin Beal works at NASA's George C. Marshall Space Flight Center in Huntsville, Alabama in the area of nondestructive testing of aerospace structures. He is interested in parapsychology and various field effect interactions associated with living systems, biofeedback phenomena and science fiction. Numerous articles on nondestructive testing by Mr. Beal have appeared in recent technical journals.

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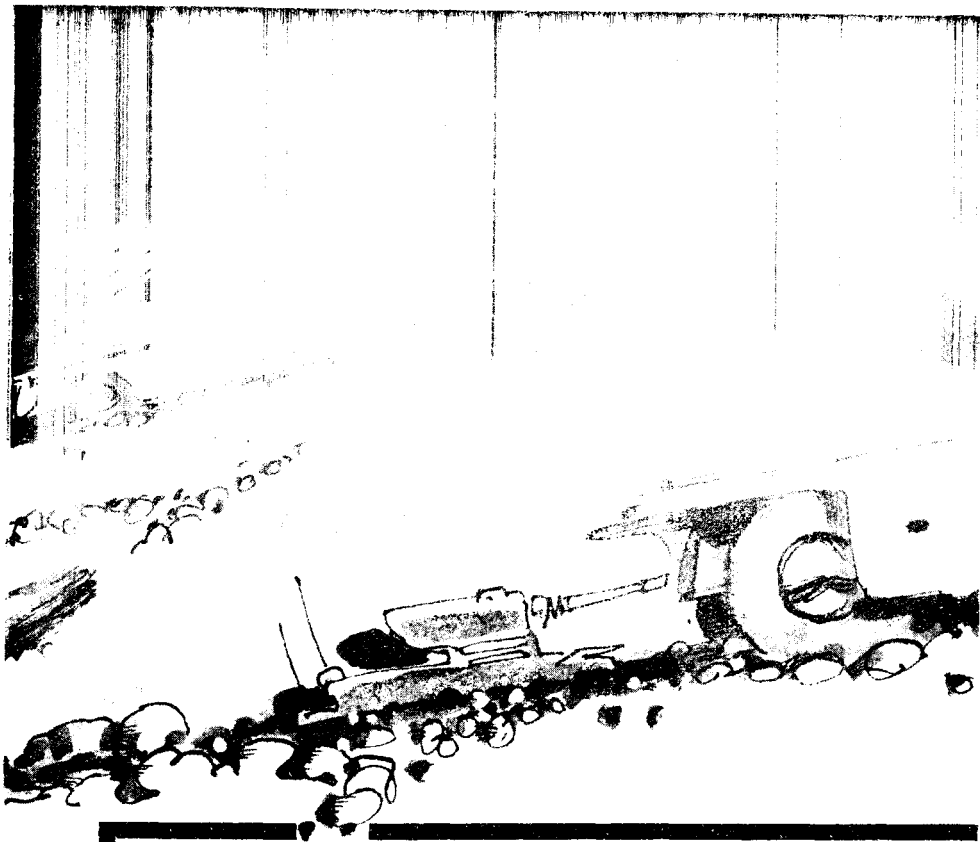

MOON ROCKS

If hell can be defined as the loss of everything you've hoped for, then even the courtliest, most civilized kind of war is hell!

TOM PURDOM

The rocks have been lying on the Moon for two and a half billion years. Twenty-five million centuries before Joseph Davino was born, a small asteroid scraped the lower slopes of the lunar Apennines and smashed into the southern edge of Mare Imbrium. Rocks and boulders flew across the surface of the Moon and sat there in perfect, undisturbed silence until a machine rolled across the dusty landscape and flashed a message at its controllers on Earth. Rocks of high-

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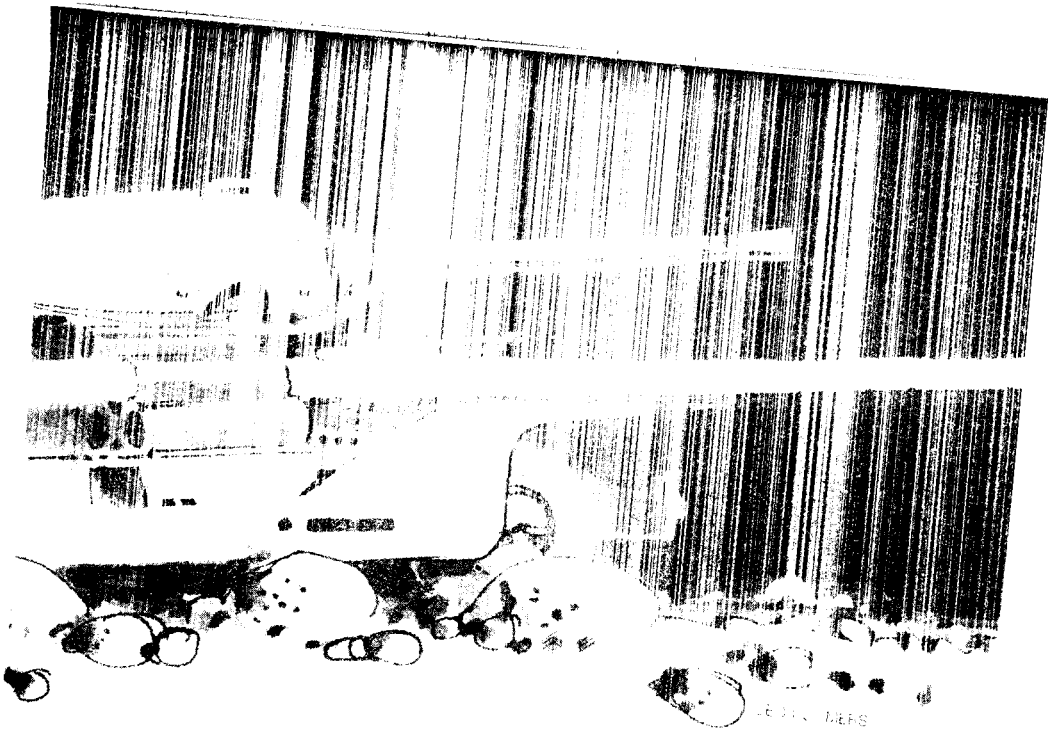

grade gold ore are lying on the surface of Mare Imbrium near the border of the region dominated by the European Economic Community. There are no tracks within five kilometers of the site. No one in the E.E.C. knows the ore is there.

"You'll be inside their radar range a hundred kilometers before you reach the site," Colonel Le-Farge says. "You'll have to pick your way through the foothills until you're almost on top of it. You'll have a double supply of consumables and I'll have Wild Bill take a supply caravan out and pick you up at Base Six. I thought about sending out a diversion but I decided you'd have a better chance if we set things up so you could take your time in the foothills."

Major Joseph Davino is a pleasant, cosmopolitan man who still feels warm and nostalgic when he thinks about the books about space travel he read when he was a child—books in which it was gener-

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ally agreed that no one would ever fight wars over gold mines on other planets. His three-year tour of duty will be up in four months and he already knows Washington is planning to follow the normal program and replace him with a new volunteer. His work on the Moon has been competent but undistinguished and he has one black mark on his record: he let an enemy combat team slip past a perimeter he was guarding and they managed to pick up six hundred pounds of unrefined gold ore and cripple a million dollars' worth of high-grade equipment. Colonel LeFarge is handing him a difficult, nerve-wracking job but they both know the colonel is giving him a break, too. The automated exploration vehicle has stumbled on a strike that looks like it may be one of the biggest finds in the history of lunar exploration. If he can sneak into the E.E.C.'s turf and snatch it away from them under their noses, the computer jockeys in the Pentagon will probably listen to the colonel's recommendation and give him the only reward he wants—three more years in which he will be two hundred and forty thousand miles away from dirty skies, dirty wars, short rations, and all the violence, frustration, and despair that seethe across the beautiful globe hanging above the lunar landscape.

Major Joseph Davino executed his mission with superlative skill and an outstanding exhibition of the qualities that make an officer suitable for combat on the lunar surface. His intelligence and his careful attention to detail demonstrate that he is the kind of tested officer we need in our forces on the Moon. It is recommended that his request for a second tour of duty be approved . . .

Major Davino hates planes, guns, and all the nit-picking restrictions of military life. He spent ten years in the Air Force after he graduated from college, however, and he transferred to automated ground vehicles and spent two years in a grueling training school when it became obvious the United States didn't need any more jet pilots on the Moon. Every year he spends on the Moon is one more year he doesn't have to spend on Earth. If he can win another tour of duty on the Moon, he may even be able to stay on the Moon until he retires.

There is also a woman—a doctor who has a permanent berth on the Moon because she is a leading expert on lunar physiology. She won't go back to Earth with him if he has to go and Major Davino doesn't blame her.

Three days after he leaves his home base, Major Davino is still creeping across the surface of the Moon. Four fully armed robot vehicles are spread out around his command vehicle in a large semicircle. Four screens are lit up on his control panel. Each robot ve-

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hicle has to be maneuvered through the foothills as carefully as he is maneuvering the command vehicle.

The foothills are a jumbled mass of rocks, craters, and low hills. The terrain can hide him from the E.E.C. radar if he is careful, but the Europs will know he is coming as soon as he lets them pick up one blip on the screen mounted on the slope of Mount Ampere. Anything that moves stands out on the lunar landscape like a ship on an empty ocean. Robot scouts will start forming a circle around the place where the radar picked up the blip. The nearest European combat team will start moving into position. Electronic detectors will start hunting for tracks that contain recent traces of exhaust fumes and vented CO_2.

The robot vehicle on his left passes behind a rock. The screens blank. The muscles in his back and legs tense.

The vehicle on his left is Gun Buggy Three. It is about five hundred meters away and it is the only gun buggy he can see. All the signals traveling between him and his squadron have to be relayed through Three. His vehicles are all traveling on automatic until Three creeps past the rock and resumes contact.

A well-placed enemy observer would know he is now out of contact with his squadron. He has fought six hundred missions in the computer simulator and he has usually picked a moment like this when he has been the ambusher. His emotions responded with a rush of pleasure every time he hit the main link in his opponent's commo chain during a temporary blackout. His simulated gun buggies swept in before his opponent could re-establish the chain and the simulated enemy squadron was destroyed in five minutes.

He is not afraid he will die. No one has ever died in a battle on the Moon. The struggle on the Moon is a limited, courtly warfare in which men withdraw or surrender when they are outmaneuvered. Someone may die by accident sooner or later, but death is not his major worry.

The screens clear. He taps the halt button and the screens freeze while he studies the landscape. Four will have to move thirty meters to the right and peer around that medium-size crater on his left. Three will have to drop back twenty meters and hold position so it can maintain the commo chain. Two and One—

He taps out his orders on the computer keyboard mounted on the left side of his control panel. The computers on the gun buggies verify the orders with the computer in the command vehicle and five green lights flash on the control panel. He presses the start button and the whole squadron creeps forward.

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He has been moving through the foothills like this for two Earth days. The whole squadron stops every hundred meters and he plans the next move for all five vehicles.

The four screens blank again. He turns his head and searches the landscape for Three. There was nothing between him and Three when he set the course. Two of the buggies will lose contact in about seventy-five seconds but Three is supposed to stay in contact until he reaches the next halt point.

The screens light up again. Three rises out of the ground. It has slipped into a depression he didn't see. It blanked out before its computer could react to the new situation and raise its antenna.

The other two buggies lose contact right on schedule. Their screens come on again thirty seconds later and he stops at another halt point. He pulls a plastic bottle out of a compartment and rolls two tiny drops of liquid down his tongue.

Warm, pleasant sensations spread through his body. His brain is still functioning but every important muscle in his body is relaxing for forty-five seconds. He is a muscle cramper when he gets tense. Three sips on the bottle during his working day can fight off fatigue better than any energizing drug on the market.

He is only eighteen kilometers from his ultimate destination. If he can keep on moving without stopping to rest, he will be there in about eight hours.

He puts the bottle back in its compartment and studies the screens. Orders go out to the gun buggies. They move forward thirty meters and the screens blank once again.

His hands tighten on the steering wheel. He searches the terrain on his left and sees a thin cloud of dust moving across the area between two small craters. Three has rolled into another shallow depression before its computer can raise its antenna. The sun is approaching its maximum altitude above the horizon and he is having trouble seeing the smaller variations in the surface.

Three's black and white framework rises out of the depression. Two screens light up on the console. The other two screens are still blank.

The halt order leaps out again. His fingers tap out more orders. Gun Buggy Four rolls away from its position and starts creeping along the bottom of the big, rolling hill directly in front of him.

The two blanked-out screens belong to the two buggies spread out on his right. Gun Buggy One is supposed to send its signals to Two and Two is supposed to relay its signals through Three. Two is the buggy the Europs will probably hit first if they're ambushing him. Knock out Two and One will be

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isolated. The first shot in the battle will leave him with two working gun buggies in contact with the command vehicle.

His eyes dart across the screens and the landscape outside his windows. Electronic probes leap out from every vehicle. He moves Three closer to the command vehicle and guards his left flank.

Four rolls its front end around a boulder at the bottom of the big hill. Its camera pans across low rises and small, shallow craters.

There is no danger he is going to die. The bottle in the compartment is looming in his mind as if it is as big as Mount Bradley but there is no danger he is going to die. The stakes are high but the Europs know they will be exposed to retaliation if they actually kill someone.

The stakes are high but they are not decisive. One hundred overpopulated, technologically advanced nations are jockeying for position in the world economy and bigger gold reserves can give a country a stronger currency and a temporary, marginal advantage over its competitors. You cannot eat gold and you cannot use it to power your machines—but you can use it to back up your currency and make the other guy give you a little more of his goods for a little less of yours.

You don't even have to transport the gold back to Earth. It only costs seven dollars and fifty cents to ship one pound of payload back to Earth, but the gold can be buried in a base on the Moon and be just as useful as gold buried in Fort Knox. Five other major powers have bases on the Moon and the gold can be transferred from base to base if actual transfers of real metal are deemed necessary. Two of the smaller countries on the Moon have even discovered they can back up their currency with unmined gold and save themselves all the trouble of actually digging the stuff up and turning it into neat, shiny bars.

A red and yellow flare rises above the horizon on his right and arcs across the black sky. Gun Buggy One has been attacked. It kept moving forward after the commo link was cut and it is reacting according to its automatic program. Its sensors have picked up enemy machines and it has verified that the machines are operating like hostile gun buggies and not automated scouts.

Davino's fingers dance across his console before his emotions can react. Six hundred engagements in the simulator take command of his reflexes. Gun Buggy Four changes course and takes up a position between the hill in front of him and a low crater on his right. Three moves left two hundred meters and trains its camera on the left side of the hill.

They have eliminated two of his gun buggies but they still don't

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know where he's going. He can still slip by them if he can knock out the other guy's gun buggies when they close in. No country on the Moon has more than a dozen combat groups. They will try to trail him but there is still a good chance he can slip through their net and reach the site.

He will have accomplished something even if he just destroys their equipment and returns to his base. He has lost fifty percent of his equipment but the colonel will still give him a good report if he destroys more of theirs. Two other combat teams are waiting in reserve. Somebody else may slip through their net if he weakens it.

A red alarm light flashes on the control panel. A fuzzy, brownish shape rolls across Three's screen. Three's gun turret swings toward it and it disappears behind a crater before the radar sight can lock on.

Two more flares rise on Davino's right. Gun Buggy One is still evading its assailants and trying to reestablish contact with the command vehicle. Its automatic program is advising him it is definitely being attacked by two enemy gun buggies.

Davino repositions Three's gun. A little pulse of hope slips through the lid he has clamped on his emotions.

He now knows where three of the Europ's gun buggies are located. The Europ's command vehicle and his other gun buggy have to be located somewhere between them.

There is a very good chance, in fact, that one of the Europ's vehicles is hiding behind the hill in front of Davino. There has to be something in that general area if the Europ is still in contact with all his buggies.

The buggies he has located can all be operating on automatic, of course. The Europ could have sent them into action and hidden his fourth buggy somewhere else. But he knows that isn't very likely. All three enemy buggies are engaging in aggressive actions; he knows the two buggies on his right are trying to destroy One and he is pretty certain the buggy he saw on Three's screen was trying to sneak around his left flank. A gun buggy can engage in evasive action on automatic but nobody in his right mind is going to let a buggy attack by itself. Suppose it shoots at a manned command vehicle by mistake?

Davino has always taken big chances when he has worked with the simulators. Sometimes he has won, sometimes he has lost. Aggressive guys do O.K. sometimes, and cautious guys do O.K. sometimes. There are no hard and fast rules—but his six hundred battles in the simulator have taught him one important lesson. When they catch you in an ambush and knock off a big chunk of your fire power, you may as well be aggressive. You may lose anyway, but you don't

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stand a chance if you lie still and let them draw the noose around you. Five buggies will close in on him from five different directions as soon as the Europ pulls his troops off One. They may be closing in on him right now.

He taps out another series of orders on the console. Gun Buggy Four starts rolling around the right side of the big hill. Three starts rolling up the slope.

The command vehicle rolls up the hill thirty meters behind the dust and rocks arcing away from Three's back wheels. A shallow, unexpected depression catches Davino by surprise. All four wheels leave the ground in the low gravity and come down with a soft bump that makes the cockpit rock from side to side like a cradle. The gun buggies are traveling at their top combat speed—thirty kilometers per hour—and they are leaving the ground and sailing through space every twenty or thirty meters.

He speeds up the command vehicle and catches up with Three as he approaches the top of the hill. The command vehicle sails over the top of the hill with Three on the left and Four racing around the bottom of the hill one hundred meters below.

He is looking down a long, gentle slope that stretches away from him for several hundred meters before it merges into the rolling lunar landscape. There is a beat-up, heavily cratered boulder field at the bottom of the slope and there is another big hill on his right, about five hundred meters in front of him.

A red and white vehicle is parked between two small craters on the top of the other hill. It has an armored, bubble-shaped cockpit and there is a big blue cross on the front end.

His eyes sweep across the boulder field. A flash of reflected light grabs his attention. An enemy gun buggy has been stationed inside a jumble of craters and boulders near the front of the field. The boulders are taller than the buggy, but there are big gaps in the jumble and he can see the top of the antenna and part of the framework near the middle of the buggy.

A moving cloud of dust catches his attention on the left. A small four-wheeled vehicle is rolling across the slope toward Three. It is about one meter long and the square, black box on its front end is a warhead containing several pounds of the latest development in high explosives.

A gun buggy crawls around a crater near the bottom of the hill. Its gun turret swings toward Three. Two more wheeled torpedoes drop off the arms on its sides and race up the hill. The gun buggy in the boulder field rolls out of its hiding place and turns its gun toward Three.

Davino's hands leap into action.

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Six hundred hours in the simulator have made his responses as automatic as the actions of his gun buggies.

Magnetic latches release the torpedoes mounted on Three. Homing devices lock on their target and send three torpedoes rolling toward the European buggy on the left. Three swerves forty-five degrees and turns its gun turret toward the buggy in the boulder field.

Guns flash on the enemy buggies. A silent explosion erupts near Three's back end. A crater spreads across the lunar surface as if someone is blowing into a box of sand.

A light on his control panel tells him Three has fired its main gun. Another cloud of dust and rocks sails into the sky. Another shell slides into the chamber of Three's gun.

Three's machine guns open on the torpedoes closing in on it. The European buggy on the left swerves away from a torpedo and rolls behind a crater. The buggy in the boulder field fires another shot.

Davino's hands have been hopping across the console as if he has been playing two melodies on the piano at the same time. He has been guiding Four through the bumps and craters on the side of the hill at the same time he has been handling Three. Four has been sailing over dips and swerving around craters at top speed and it is now racing toward a point at which it can open fire on the boulder field.

The Europ has seen Four coming around the hill. The buggy in the boulder field is turning its turret toward Four but the Europ has miscalculated by at least ten seconds. A big, ragged hole blossoms in the front end of the buggy. The front end skids to the left. The wrecked buggy comes to rest with its gun lying across the side of a gray boulder.

Davino turns toward the other enemy buggy. The lights on his control panel tell him two of his torpedoes are still active and are still rolled into a network of craters but he can still see the top of its turret.

Davino twists a dial on the control panel. The command vehicle swings to the right and rolls down the hill with the two gun buggies racing along with it. Electronic fingers leap at the European command vehicle parked on the other hill. Gun turrets swing toward their target.

Trumpets ring in Davino's mind. The Europ could have backed up and disappeared over the hill if he had reacted fast enough, but now it's too late. His sights are locked on the bastard's cockpit and nobody can deny it. The other enemy gun buggy is on the other side of the boulder field and it will be at least thirty seconds before it can work its way through the boulders and train its guns on Davino's ve-

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hicle. Surrender or die—and nobody dies in this war. You go back to your base with your command vehicle stripped of its weapons or they take you and your vehicles prisoner and exchange you later. But nobody expects you to fight when the enemy has the drop on you. This is the Moon, gentlemen, not some crummy jungle in South America.

He can disarm the Europ and push on to his destination. He can radio LeFarge and have them send in the reserves while he patrols this area with his two gun buggies and keeps his prisoner incommunicado. It isn't the kind of victory he was hoping for, but LeFarge knows they gave him a rough assignment. LeFarge will give him a good report. Everybody in Washington will know they snapped up the prize because Major Joseph Davino outmaneuvered an ambusher and tore a big hole in the enemy's defense system.

Movement catches his eye. Two red and white buggies are parked on his right with their guns trained on his cockpit. The two buggies that have been pursuing One have come up in time after all. They have been maneuvering through the craters while he has been fighting the Europ's other buggies and the Europ has brought them into action with seconds to spare.

Davino's fingers rest on the buttons that will send three shells flying toward the Europ's command vehicle. Nobody will ever know if

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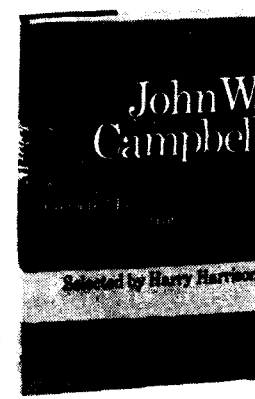

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he pushes the buttons and fires on the Europ in cold blood. Nobody has died so far but accidents can happen. One of the shells will probably hit the Europ's command vehicle before the Europ can fire the guns on his two buggies. The Europ may even be getting ready to kill him before he kills the Europ. How long can you fight a war for high stakes before somebody cracks?

The snotty computer jockeys in the Pentagon will never forgive him if he lets that find get away. LeFarge will know it has been one of those things, but LeFarge won't be able to help him. He took this job because he knew he needed a big success and now there's only one way he can get it. Nobody in the Pentagon is going to reward him for making a good try. The orders that will send him back to Earth are already being processed in Washington. Nobody is going to pat him on the head and tell him the Pentagon has a kind heart and everybody knows he and Dr. Cunningham are a wonderful couple and shouldn't be torn apart.

He will never see Annie again. He will live out his life on a cramped, crowded, smelly, poisonous world where you have to fill in a form to look at a mountain.

The two guns on the enemy buggies turn away from his cockpit at the same time his own guns turn away from the Europ's command vehicle. The gun barrels swing around until every gun is pointing at a spot on the horizon that is at least one hundred and twenty degrees from the nearest target.

A light flashes on Davino's console. He presses a button and static fills his earphones.

"I will back off two kilometers south," a voice says in his earphones. "Will you back off two kilometers east?"

"I will back off two kilometers east," Davino says.

"Thank you. I think you fought most gallantly. I would have been completely defeated if my two gun buggies hadn't come up faster than I had any right to expect."

"I thought your ambush was very well planned. I didn't know you were anywhere near me until you attacked."

"We only picked you up on the radar once. My commanding officer said you were one of the most skillful drivers he had ever seen. I am Captain Anton Olivini."

"I'm Major Joseph Davino. It's been a pleasure meeting you."

"It's been a pleasure meeting you also, Major. May you have an easy trip home."

"The same to you, Captain Olivini. Good luck."

"Godspeed."

The six vehicles back away from each other with their guns carefully pointed backward. Davino wishes he can feel noble but he soon realizes he can't. ■

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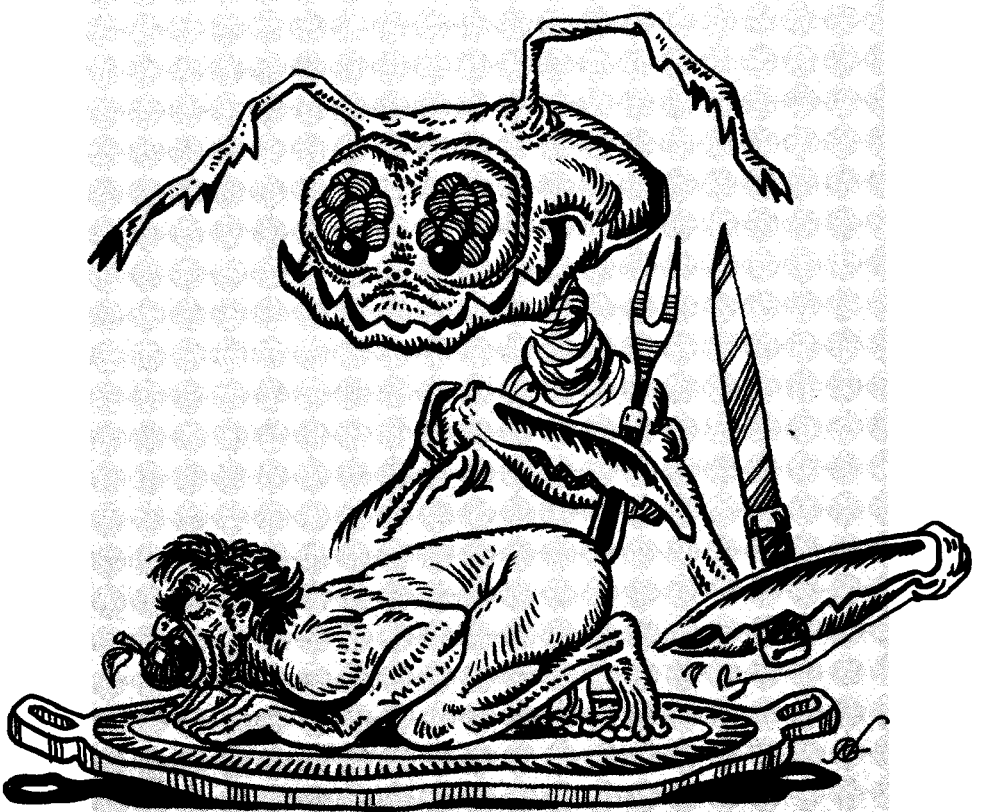
NOT POLLUTED ENOUGH

One man's meat
is another man's poison—
if it's treated properly

G. H. SCITHERS



KELLY FREAS

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"Now take pollution—" began Professor Timble, raising his voice over the rumble of the club car's wheels on the trackwork at Mollusc Junction.

"*You* take pollution," said Mrs. Jonas, a bit sourly. The last hand had been a perfect disaster. Old Dr. Wimple usually played superb bridge with a couple of Manhattans, but Ricky, the club-car attendant, must have mixed them stronger than usual.

"No, no, I mean figuratively," said Professor Timble. "Not that way either," he added hastily, with a glance at old Dr. Wimple. The doctor, who was looking a bit glassy-eyed, ignored him. "I mean all this excitement about DDT and so on, all this political issue-making—"

"Issue-making?" said Mrs. Jonas. "*Political?* With the California brown pelican practically extinct already, and human milk—you know—" she made a gesture, at once explicit and ladylike, "with more parts per million or whatever than the WPA people allow—"

"You mean FDA," said Professor Timble. "Food and Drug Administration. That's what I was talking about. They set the limits far too low, really. People aren't affected by DDT at those levels; it's all a headline hunt. The stuff's no more poisonous than aspirin. And when you consider how many lives have been saved from malaria, and that typhus epidemic in Naples during the war—"

"Jus'—I mean, just means there'll be more people t' starve, next time there's a crop failure," said old Dr. Wimple.

"But with DDT, the insect damage—"

"An' wha' happens next time there's a drought?" asked the doctor. "DDT *and* medicine, they're the banes of—of humanity, lately." He beckoned to the attendant. "Ricky? Here."

"Now look," said Professor Timble. "Have you ever *seen* a case of anybody dying because of DDT? Or heard of one, even? This parts-per-million stuff—"

"What about these crop dusters you hear about, coming down with convulsions and things," interrupted Mrs. Jonas. She gathered the cards, folded her hands on top of them. "And those grape-pickers—or am I thinking of the lettuce people? Anyway—"

Old Dr. Wimple blinked at the cup of coffee Ricky had brought for a moment, then sighed, "I suppose you're right." He drank, took a deep breath, and drank again. He turned to Professor Timble's partner and said, "You're always taking the unpopular side in an argument, Jim. Why don't you say something?"

Jim looked up from the score pad and grinned. "In the first place, biology isn't my field."

"That never stopped you before, when you wanted to argue."

"True, true." Jim scribbled a last sum and pocketed the pad. "In the second place, though, both sides of

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the argument seem pretty well represented already. Both wrong, unfortunately, but well represented."

"Wrong?" snapped Mrs. Jonas. "What's your theory, then?"

"It isn't theory that's wanted here, but data and experience. Of course, you can still draw the wrong conclusions from right data, like Columbus being so convinced that the world was only eight thousand miles in circumference when—"

"Now, now, young man," said Mrs. Jonas, "don't wriggle out of it. You said we're both wrong. Prove it."

"Well, I've but a couple of data, but they do make for a pretty strange story—"

"Go 'head. My bridge isn' too good today," said Dr. Wimple. He took another slurp of coffee, then burped gently.

Jim grinned again. "It happened a little over a year ago, when my company had a government contract to make some mods on a big radio navigation transmitter down in the South Pacific. Now, you got to remember that the South Pacific goes all the way down to the Antarctic, and this island was so small a heavy wake would have sunk it. I never did find out whether the U.S. actually owns the island, or just rents it from the French or Norse or somebody. It's too small for most maps, even. Also, being too small for a proper landing strip and out of 'copter range of anything big, the place is *really* isolated."

"And you had oil slicks washing up on the beach?" asked Mrs. Jonas, as she tucked the cards back into her cardcase.

Jim shook his head. "Like Thor—you know who I mean—or is it Cousteau?—writing about mid-ocean oil? We didn't see anything like that; too far south, I suppose. We did *talk* about pollution, though, when we weren't trying to get the transmitter to work—me, the other tech rep, and the dozen Coast Guard guys that made up the whole population of the island. One of 'em was a biologist, and he and Ralph—" Jim paused, remembering the clean, chill whip of the wind, salted by thousands of miles of blue water; remembering the sound of breakers on the half-submerged rocks that shielded the little isle, the sound of wind whistling over the concrete building and whining through the lattice of the transmitting antenna. He frowned, remembering the easy grin of Ralph, the biggest of the Coastguardsmen, as he argued with Ted one morning as they stood in front of the island's one building.

"It was about DDT that they were arguing, that very morning," Jim said slowly. "Ted had been studying biology before he signed up for a hitch in the Guard, and he was trying to convince Ralph . . ."

"I hear what you're sayin' O.K., Ted," Ralph interrupted at last, "but I been handlin' the stuff all my life, practically swimmin' in it. The

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County Agent always says, pour the DDT on heavy; and Pop and me, we sure did. And with sprayin' and dustin' and all, I must of got me soaked about as well as the crops, and it never hurt me any. What I really wish'd be for me to get enough in me to kill mosquitoes and things when they take a nip. That would—"

"Never work," said Ted, shaking his head. "Didn't you listen t' what I been telling you, Ralph? Besides, even if that much DDT didn't screw up *your* metabolism, the stuff'll get stored in your fat, not your bloodstream. So by the time—"

"Well, it was a good idea, even if it wouldn't work. Not much place to store the stuff in me, as little fat as I'm carryin', just muscle." He patted the solid bulge of biceps swelling his uniform sleeve, then grinned complacently.

"How 'bout between the ears?" asked another man who stood in the doorway of the concrete building, a few feet away.

"Now look," said Ralph, "who went and found that bad cap in the driver stage of the transmitter yesterday? And who got the generator started the day before, when you'd been workin' on it for—"

"O.K., O.K., you win," said the man in the doorway, throwing up his hands. "Hey, you and the tech reps gonna take the transmitter down again this morning? If you are, I want to work on the generator cut-over circuit some more."

The men scattered then, to the day's work. Just before lunch, a yell of "Everybody out here to catch this action—hey, you guys, outside—*quick!*" brought everyone running. Jim followed Ralph out the door, then bounced off his broad back when the big man stopped short.

"What *is* it?" asked someone.

"A—a moon rocket or somethin'?"

"Can't be; we'd of heard, and—"

"Maybe Russian? Gawd, that thing's *big!*"

Jim worked his way through the little crowd and looked up. The thing—whatever it was—looked like a small oil refinery wrapped rather tightly around a large, illuminating-gas storage-tank, and the whole affair—nearly a quarter the size of the whole island—was descending for a landing. A set of antenna-tower guy-wires was in the way. Beams of light lanced out from the top of the gigantic thing and found the guys. In a moment, they glowed red, then they parted.

"Hey! You stop that!" yelled Ralph. He dashed forward, shook his fist up at the descending thing, then retreated cautiously as it majestically settled onto the island.

Behind him, Jim heard the antenna tower, with one set of guy-wires gone, topple into the sea, but none of the men turned to watch its fall. Every eye was on the thing that towered over them.

"Now what?" said Ralph. "Ted, you're in charge; aren't you supposed—my Gawd! Look at that—at those—"

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Hatches had popped open around the lower circumference of the thing, and animals—creatures—*things* were scuttling out. They were, Jim saw, about man-sized, with upright bodies, but there were four legs supporting the chunky hip structure, and those legs, though thick and straight, bent outward at the joints, so that the creatures moved with a strangely bowlegged, almost crab-wise scuttle. The arms were hardly man-like either; the creatures held them half-raised, half-folded, but for a few that were carrying various objects. And as for the heads—Jim looked, swallowed hard, and shuddered.

"Well, at least they ain't the Russians," said a voice from the back of the little huddle of humans.

"But, what *is* it?"

"Flying saucer, silly."

"Some damn saucer. Hey, Ralph, say somethin' to 'em!"

"Uh, what'll I say?" asked Ralph, turning to look at the men clustered behind him, then jerking his head back to keep an eye on the advancing horde. One, carrying a two-foot cube, scuttled within a couple of yards, put the cube down on the sand, and stood motionless while another creature—about a foot taller than the rest—moved slowly up to the cube.

The tallest creature chattered his mandibles for a second, then the cube bellowed, "RITUAL INITIAL GREETINGS!"

Everyone jumped; Jim saw Ralph wince, then heard the big man growl, "Not so damn loud; we're not deaf—least, not yet."

The cube chattered; the tallest creature chattered back. The cube spoke again, "Ritual and appropriate apologies, we give you. Your deafness, we do not intend. So, English, we are speaking?"

"Uh—ah—you mean, are we speaking English?" asked Ralph. "Yeah, sure. But we're United States—uh—I mean, we're Americans and—"

While Ralph explained, Jim took a careful look at the creature. The sturdy torso and thick limbs seemed to be encased in some kind of armor or shell, like a crab? No, the legs were too thick for a crab, and there weren't enough of them. Still, it reminded him of something familiar . . . He turned to Ted, touched his shoulder. "What—?"

"Extraterrestrial," said Ted, almost in a whisper. "But that isn't saying anything, really. Six limbs, and those jaws! I'd say it's a kind of giant insect, redesigned for the size, semi-graviportal legs and a good circulatory system, only—"

"Like one of those—whatcha-call-ems—praying mantises?" asked someone behind Jim.

Jim took a deep breath. The creature had none of the spidery grace of a mantis, but it was built along the same general plan. Maybe.

"No way," said Ted, firmly. "If it's extraterrestrial—extrasolar, too—it couldn't be related to any of our insects. It just happens—"

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"Speaking one at a time, we ask you!" the cube said loudly. The tallest creature pointed a claw-tipped arm at Jim and resumed chattering his mandibles; the cube spoke a second later. "Speaking several at a time, you confuse the speak circuit."

"Uh, that's a—a translation machine?" asked Jim.

"Ritual and appropriate apologies, the wrong word we used. This, a translation machine is. So, similar to us, you have an insect?"

Jim was still puzzling out the sentence when Ted nodded, said, "Yes," and held up a hand with thumb and forefinger spread to show size. "Little thing, like so. But you can't be *related* to our—"

"On this island, you have not any?" interrupted the cube. Ted shook his head; the chattering creature and its translating machine went on: "Incompletely, we explored this planet; although many times, we have visited it. Ritual apologies, but the word 'related' confuses us. Related, meaning common ancestors, we are not to your insects. But related, meaning of the same meat, we are precisely like so."

Ted asked, "You mean you're really—uh—just the same as insects, only bigger and smarter and—and you evolved on another planet and all?"

"We are so," the creature said through his translating cube. "By the nature of things, only the five chief kinds of large land life are possible. As every mid-school Dreth knows, these five occur—but for a life-science lecture, we are not with an appropriate instant. But, on full intereatability, we assure you."

"Uh—intereatability?" asked Ralph.

"A word of your language, it is not?" The creature opened his claws wide in what seemed to be the equivalent of a shrug. "Ritual apologies; new your language is to our translation machine. In different words I say my meaning. So: safely and easily, we Dreth and you internal skeleton animals can eat each other."

"*Eat* each other!" said Ralph. "Now look here—"

"Cool it, Ralph," said Ted. "He doesn't mean the—uh—Dreth go around eating people, just—" he turned to the tallest of the insectile Dreth and asked, "What have you been eating, anyway? Around here, about the only thing would be whales and porpoises and—"

"Whales? The large ocean air-breathing animals about eighteen glirts in size?" asked the tallest visitor. "To us, *you* should give ritual apologies. Being now rare animals in risk of disappearing, of course we do not eat them. Ever conscious of the balance of life, we Dreth do not do such things. Always after proper study of abundances and overpopulation, we establish our feeding routes. So, if tilted is the balance of life, we do to restore it. So also, if overpopulations we find, then therefore—"

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"*What* feeding stations?" asked Ralph abruptly.

"In our interstellar journeys, we establish stopping places for feeding our crews. For carrying adequate prey aboard, our ships are too small."

"Too small?" snorted Ralph, glancing up at the spaceship that towered over them all. "Just what are you leadin' up to, anyway?" he demanded.

"Since at last you have asked, it is no longer impolite to say this," said the Dreth. "Ritual apologies nevertheless, but your kind are too numerous for the balance of life on your planet. So also, in selecting your own feeding, your kind does yet more harm to the balance of life. In our recent survey, the air poisons from your population clusters we–"

"O.K., O.K., what are you bugs plannin' to do about it?" asked Ralph. The broad-shouldered man stood a pace in front of the rest of the men, facing the tallest Dreth with the translation cube at his feet. "Kill us off with A-bombs or poisons or somethin'?"

The tallest Dreth drew himself up to his full height and clattered his claws for a moment, while the cube said, "Expression of extreme anger!" The Dreth's mandibles chattered, and the cube went on with, "Ritual apologies, I should demand of you. Your question is a great discourtesy. That we Dreth are without the science of the balance of life, you are suggesting? This is quite–but I forget, you are still primitive." He snapped his claws again; Jim saw the chelae were somewhat like both the pincers of a crab and the grasping arms of a mantis.

"So," continued the tallest Dreth, "many dozens of erbtors ago, when your kind were not so numerous, a regular stopping place this planet was. Since they were in proper numbers then, whales we took. So, since even then your kind were not rare, for variety we would catch an ocean vessel or even on one of the islands to the north we would land–"

"The *Marie Celeste*–that ship with the crew gone," gasped someone behind Jim.

"Been enough ships vanished without a trace," said Ted. "Maybe *that's* why the Polynesians were that way about cannibalism."

"Perhaps," said the tallest Dreth, through the translation machine at his feet. "You are of their tribe? Most excellent and admirable, we found them."

"No," said Ralph.

"Ritual apologies," replied the Dreth. "But traffic lapsed for many dozen erbtors, during the Nurithan disturbances." He shuffled all four of his feet for a moment. "So now, the disturbances being disposed of, I and this scoutship and my crew are re-establishing the interstellar routes. So also, the feeding stations, we–"

"Hey! You're not going to–to eat one of *us!*" interrupted Ralph.

"Minor apologies; not one, all."

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"*All* of us? But you can't—" Jim glanced around; the little group of men was surrounded by the man-high Dreth now. "Look, there's lots of bigger islands—maybe up north—"

"Jim," objected Ralph, "we can't send these—these things somewheres else. They'll—damn, they'll do us in. But—"

"Perhaps," said the tallest Dreth, "a demonstration we can show you?"

He pointed to the island's one tree, then drew back his claw. "The plant I should not damage. Instead, the corner of the building." He pointed there, clicked his pincers twice. Light, white and intense, beamed down from the top of the spaceship, and a cubic foot of concrete exploded into dust. "So," the Dreth said through the cube, "of the uselessness of resistance, we have—"

"Yeah, yeah, we're convinced," growled Ralph. "That and gettin' outnumbered by a hundred or so to fourteen." He bit his lip, then turned to Ted. "'Member what we were talkin' about this mornin'?"

"Yes, but—"

"Might work?"

"If it doesn't—" Ted glanced at the waiting Dreth. "You going to—uh—take us all at once, or—"

"One at a time, we would prefer. So, in this way, any indigestion will be restricted to the first feeders. Does your custom—"

"One at a time," said Ralph, firmly. "And me first."

"But I'm the senior," objected Ted. "I'm in charge; I should—"

"Ted, shut *up,*" growled Ralph. "If this doesn't work, you can get ate next all you like, but I'm goin' first if I gotta paste you one."

"Ritual apologies for interrupting a discussion," said the tallest Dreth via the translator, "but our custom is to save the biggest and best to last. With appropriate apologies for touching on your customs, why—"

Ralph yanked off his shirt, tossed it aside. He glared at the Dreth, then ripped off his trousers and kicked them away. "I don't give a howlin' hoot fer your damn customs," he growled. "I'm goin' first 'cause I want to. O.K.?"

The Dreth spread his pincers wide; behind him, the rest of his horde pressed close, pincers twitching. One, standing just behind the tallest, chattered his mandibles; the translation machine picked up his remark as, "Extreme fortune; he is in moult!"

Another chatter of mandibles came through: "He is shedding his integument. The records did not mention—"

"O.K.," said Ralph, completely stripped now. "What next? Do I go in your kitchen and get cooked there, or do you bring the stuff out here or what?"

"No, no, we'll eat you right here," replied the tallest of the insectile Dreth. "Is there something—?" he asked, at Ralph's startled yelp.

"No, there's an old joke—well, it isn't very funny this way. But, aren't you going to—"

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"Quite unbearable, your insults are becoming," interrupted the Dreth. "You should submit a major ritual apology for even hinting that we would eat you without a pain-stop spray first." He gestured; a smaller Dreth scuttled forward, thrust a small implement under Ralph's nose. Jim heard a hiss, saw Ralph sneeze. "So, in a moment you should have no pain feeling. Now about that apology—"

"I'm gettin' ate alive; isn't that enough apology for ya?" growled Ralph. In a calmer tone, he went on, "What is that stuff, anyway?"

"General purpose pain-stop for internal skeleton animals," explained the small Dreth. "Quick acting and, of course, not persisting; none of any civilized race's chemicals persist, you know. There should be enough interval now. Would you pinch yourself anywhere?"

Ralph did. He looked surprised, pinched harder. "Damn! It works," he said. Jim saw the small Dreth move in again, pincers extended. "Hey!" Ralph said, looking up at the tallest of the giant insects. "Aren't you goin' to—you know—lead off?"

"Ritual apologies, I give you for even hinting such a thing," said the tallest Dreth, "but in case you should be unsuitable eating, it is our custom—but I should be introducing you to my spouse's second eldest brother, who has the honor to have the post of first taster of the expedition."

"Yeah, yeah," growled Ralph, frowning down at the small Dreth. "Glad t' meet ya, I suppose. Only—"

Professor Timble interrupted with a firm, "I don't believe it."

"Now really," said Mrs. Jonas. "Don't be rude. I know what you think about saucers and things, but—"

"No, no, that's not it at all. I just can't see a man *volunteering* to go first, much less being polite to the little horror that was about to start—" The professor took a long drink of his whiskey and soda.

"He wasn't, as you put it, being all that polite," said Jim, defensively. "Anyway, he was just—you know—still, it was pretty brave," he added, shaking his head as he remembered Ralph glaring at the Dreth.

"*That* brave?" Professor Timble took another sip of his drink.

"Oh, come now," said Old Dr. Wimple. "Did the lad play bridge? No? Well, it shtill—sorry—still applies. The way the morning paper's bridge writer keeps saying, if you can make your bid only if the cards lie a particular way, then you have to play the hand as if they do lie that way." He sighed. "I'm not making it very clear, am I?"

"No, no; I mean yes," said Mrs. Jonas. "You mean if—ah—Ralph's DDT didn't work, they'd get to him no matter whether he was first or last in line; but if the DDT did work after all, they'd have to—to eat him to find out, so the sooner the better, at least for the rest of you." She smiled. "Of course, Jim, your being here

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does spoil the story's suspense."

"Sorry to disappoint you like that," said Jim. "It was pretty damn suspenseful for us on the island, that morning, especially for Ralph."

"Only, if you guys are all that worried about us being intereatable—" Ralph turned and loped toward the island's one building, calling back over his naked shoulder, "Back in a sec. And Ted, if they get t' chompin' at th' bit, stall."

After a short, uneasy wait, another of the Dreth scuttled over to the tallest of the giant insects; the pair chattered mandibles for a few seconds. Then, the tallest Dreth turned to the waiting men; the cube translated his words: "A minor apology, but a question is asked. The word 'stall', used by your first-to-be-eaten but now-for-the-moment-departed-one: did he command you to delay for an interval of time, or is that you have an accommodation for horses?"

To Jim, Ted whispered, "What'n hell do I do now?"

"Like Ralph said, *stall,*" hissed Jim. Inspiration struck. "Get real insulted; demand an apology for everything in sight. The way these bugs are on politeness and—"

"How *dare* you?" yelled Ted, taking a long pace forward. "The very *idea!*" He snatched off his cap, hurled it to the ground, and jumped on it with both feet. The tallest Dreth backed up a scuttling step; most of his horde retreated two. "Never in the history of—of—of *history* has so insulting an—an insult been m-made!" Ted continued. "Calling us horses, are you?" He jumped on his cap again, ground his heels into it, then yanked his shirt off, over his head, and began to rip it to shreds. "Horses indeed," he growled, hurling bits of cloth this way and that. He stopped, pointed at the little island's one building. "Does *that* look like the work of horses?" He grabbed a handful of his undershirt, jerked hard, and tore it half off his torso. "Do I look like a horse?" he yelled, snatching off the rest of his undershirt in grabs and handfuls. "Does he—or him—or *him*—do they look like horses?" he demanded, pointing at one man, then another.

Ted stood a moment, panting, then stalked forward until he stood just inches from the tallest Dreth. "WELL?" he bellowed.

"Most major and intense apologies," replied the chief Dreth, retreating another sidelong pace. "The translation cube—the language—our ignorance—that you are to delay an interval of time, it is now clear. So—"

Jim took a deep breath, strode forward. "Oh, that's it," he snarled. He swallowed hard, forced a scowl on his face. "First you insult us by calling us horses, and now you say we're stalling—calling us cowards—claiming we're afraid!" His voice broke on the last word. He swallowed again, glanced around desperately. "Here he is," he said, putting a hand on Ted's bare shoulder, "m-moulting his—I mean, stripping off his cloth-

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ing, practically climbing into your–your c-claws, and you say he's *stalling?*"

"Hey!" came a yell from the building. Jim stopped searching for his next words, whirled, and stared. Ralph, still naked, was trotting towards the group of men and Dreth, with a package under one arm and what looked like a large ham in his hands. "I *told* you guys to wait till I got back," Ralph said, as he joined the group.

"I was waiting, but these things–you know." Ted jerked his thumb at the waiting crowd of giant insects. "Wait a minute; that's the ham for lunch."

"Yeah?" Ralph grinned, lifted it to his mouth, and bit out a big chunk. "Good, too," he mumbled as he began chewing, then held out the ham to a nearby Dreth. "Before you begin trying us out, take a few bites of this first, see if we're really as intereatable as you say."

The Dreth scuttled backwards a step, waving its antennae suspiciously. "Do you mean you do eat each other after all? In that case, an apology–"

"Nope," said Ralph. "Just ham. Off of hogs. I'll take another bite, while you're making up your minds." He started to raise the ham to his mouth again, but the closest Dreth scuttled to him and snatched the meat from Ralph's hands. "Hey, there," said Ralph. "There's no call for ya t' get grabby; I was just gonna take one more bite."

"Ritual apologies," said the Dreth with the ham, "but you were seeming about to devour it all for yourself." The creature lifted the ham in its claws, rotated it for a moment, then started to nibble. There was a moment of frozen silence while the rest, men and Dreth, watched a quarter of the ham disappear. Finally the little Dreth lowered the ham, licked its mandibles clean, and announced, "Delicious!"

"Well, I suppose so," sighed Ralph. He pulled the package from under his arm and unwrapped it.

"What are you doing with that?" demanded the station's cook, from the huddled group of Coastguardsmen. "That corned beef was for supper."

"Way I figger it," said Ralph, "either we won't be around for supper, or else we'll be having more of a celebration than corned beef's good for." He took a bite of the beef, then said, "Not bad, though." He chewed for a moment. "Lemme take another bite, before you–hey, there!" One of the Dreth had grabbed the corned beef away from Ralph; now, out of Ralph's reach, the creature was burying its mandibles in the pink meat.

"Medium apologies," said the tallest Dreth, "but they have been for so long without variety in their diet that they are being hasty." He gestured at the surrounding crowd of Dreth, where the remains of the ham were going from claw to claw, with each biting off a mandible-full before

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passing it on. "They are forgetting that, since we will eat you, nothing of what you devour beforehand will be lost to us."

"Uh, you eat *everything?*" asked Ted. "Innards and all?"

"Rudeness is a custom among you internal-skeleton beings, it appears to me," said the tallest Dreth, while the translation cube put a tone of disapproval into the words. "No civilized being would leave the landscape littered, nor leave eatable parts uneaten. Even the bones, especially if you are stiffened with calcium and phosphate, will be devoured to the last." A sharp grinding noise interrupted it; when the noise subsided, the Dreth went on, "That was the bone of the ham, I believe. Now, your first-to-be-eaten?"

Ralph gulped hard, paled, but stepped bravely up to the chief Dreth. "Aren't ya gonna wait until there's been time for—"

"It would be a discourtesy to keep you waiting longer," said the Dreth. "Clearly our previous expeditions found your planet's meat proper, and the small sample you provided has been assimilated without distaste. We Dreth metabolize quickly. That you ate from your samples shows no poison has been added; a minor apology, but thoughts such as this must be thought on a not recently visited planet. Now, the first taster again." He gestured; the small Dreth—Jim assumed it was the one who had been introduced before—scuttled to Ralph, claws at the ready.

"Hey, don't grab me *there,*" protested Ralph.

"Is not the pain-stop effective?" asked the small Dreth. "It is just the right—"

"Look, who's gettin' ate, me or you?" growled the big man. "As long as it's me, you'll do it my way!" He scowled at the Dreth, then patted his rump. "Start here."

"As you insist," said the small Dreth, reluctantly letting go its first hold and moving around to Ralph's side. The small Dreth spread its mandibles, reached for Ralph's hip. Jim felt his own stomach turn over; he looked hastily away.

Jim saw some of the men watching in sick fascination; others had squeezed their eyes shut. One man, the cook, had turned almost green. The Dreth, however, were all watching with what Jim could only interpret as avid interest. At least, all but one that was beginning to twitch its antennae aimlessly. Jim stared a moment, then turned back to Ralph and the Dreth who had taken a nip out of the big man's rump. "Whatever your name is—you, the one in charge," said Jim. He jerked his thumb back over his shoulder. "Something's wrong with one of your—uh—people." He turned away quickly, away from the Dreth that was about to take another nip out of Ralph, just in time to see the twitching Dreth stumble and fall over its own legs. Another Dreth limped to the tallest of the horde.

"Ritual apologies," the cube trans-

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lated, "but since I ate the ham, I am tending to forget to breathe."

"Forgetting to *breathe?*" said the Dreth leader. "At once, to the ship, *go!*" The tallest waved its chelae; his mandibles chattered. "Give assistance to those unable! The alerting of–" and the cube lost the rest as the big insect scuttled around, directing the evacuation of the half-dozen Dreth who were now helplessly twitching on the ground or staggering in circles.

"Just in time," whispered Ted, as the men watched the confusion swirl around them. "Ralph, are you–?"

"I'm O.K.," said the big man, looking down at the point where a trickle of blood was welling from a small wound on his hip. "It don't hurt none, and I won't miss what he bit off; I'm too big there anyways." He glanced around. "Wonder what happened to th' little–oh, oh; here comes the boss critter now."

The tallest of the Dreth, flanked by two more of the giant insects, halted their approach a half-dozen paces away. "Whether apologies are required, I do not yet know," announced the Dreth. "It is visible to all that the samples you brought us are giving some problem. Whether your associate is digestible, we will have to discover with caution. The first taster–"

"Isn't that the one," said Ralph, pointing behind Jim, "running in circles? That must be; his claws are all bloody."

"Yes, it appears so. One hesitates to say, out of politeness, but it is almost as if there is a poison–"

"There is, there is," said Ralph, with a broad grin. "Touch of DDT. You bugs, with big brains and all, must be awful sensitive t' th' stuff, but it don't bother us internal skeleton animals a bit. Whole planet's soaked in th' stuff by now."

"Deepest condolences," said the Dreth. "You have been overtaken by a natural disaster?"

"Nope," said Jim. "We make the stuff. By the ton."

"*Make* it? Disgusting–utterly uncivilized. We shall quit this–this polluted place at once." The giant insect turned away while the cube translated, "At once; *board ship!*"

"Wait!" yelped Ralph. "How about–?" he pointed at the Dreth with the bloody claws, who was now rushing madly around the gigantic space ship, claws waving in the air.

"No time," said the tallest Dreth. A medium-sized one picked up the translation cube; together the pair scuttled for the ship. "We would be all day catching him, and doubtless the very sands are saturated with your horrid poison; ritual apologies but you must dispose of him yourselves. Perhaps in place of–" The two insectile horrors sidled through a hatch, and the ungainly craft lurched into the air and fled toward the sky.

"My God!" said Ted, as the men watched the Dreth ship disappear. "I had no idea we were that soaked with DDT."

"Well, I was afraid th' ham might

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not be," said Ralph, "so I sprayed it and th' slab of beef with a bug-bomb I found in th' galley. Some farmers don't lay on the DDT like me and dad."

"And then you took a few bites to show the bugs it was O.K.?" asked Ted. "Gave you a chance to spray yourself too."

"Spray me?" demanded Ralph, indignantly. "That would be cheating, wouldn't it? I *told* you guys I got enough DDT in me already."

"Well, granting your adventure really happened, shall we say, as you told it," said Professor Timble, "I can see how it proves the point about a pesticide saving your lives. And for that matter, a lot more lives too; it would be rather awkward for those, how did you name them, Dreth using Earth for a quick lunch counter. But the other side of the picture—"

"How come nothing ever showed in the papers or TV?" asked Mrs. Jonas. "With all these leaks, I don't see how the government could keep it all secret."

"Government never heard about it," said Jim. "We all agreed we'd rather not go through a big scene, so we worked out a story about lightning hitting the guy wire and dropping the antenna, and Ralph getting a little chunk taken out when the wire whipped around and hit him in the butt. What else could we have done? And who would have believed us?"

"I suppose you're right." Mrs. Jonas paused for a thoughtful moment. "Still—with overpopulation and the A-bombs and all, maybe being a lunch stop wouldn't be so bad, the way we're messing up things on our own." She patted her hair absently. "And you had that translating machine and that anesthetic; I'm not completely sure it's such a good thing that it turned out the way it did."

"Oh, come on now, Mrs. Jonas," said the professor, "if you really want to see overpopulation, go take a look at the inside of a livestock feeding pen. If we're going to solve our overpopulation problems, we're going to have to do it ourselves. However, that anesthetic—"

"I do not think so," interrupted Old Dr. Wimple. "If there is anything we do not need, it is another 'perfect' anesthetic. When I think of all the misery and trouble we've had from one perfect pain-killer after another, I think we'd be off better having none and spending the effort on curing causes instead of symptoms." He looked up, called, "Ricky—another cup, please?"

"You are right about that," said Jim. "Even in the three-four days the pain-killer was working on Ralph, he found he was bruising himself and getting cuts and burns and things, because he couldn't feel them hurt; that kid was *glad* when he could feel pain again."

The doctor blinked gravely around the table. "And of course, the last of the insect monsters—Ah,

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thank you, Ricky—that's where the example on the other side of the pollution argument comes in, doesn't it?" He picked up the refilled cup and sipped.

"Yes, it does," said Jim. He grinned at the obvious puzzlement on Mrs. Jonas's face. "The last of the Dreth, the first taster, eventually ran into the side of the building and knocked himself cold, and somebody suggested that since the Dreth had eaten our lunch—dinner too—and even took a couple of nips out of Ralph—" Jim grinned again and licked his lips.

"You didn't!" said Mrs. Jonas.

"We did," said Jim. "Tasted like king crab, only more so, if you know what I mean."

"But the other side of the pollution argument?" said the professor. "I don't—"

"Don't you see it?" asked Old Dr. Wimple. He took another sip of coffee. "Just think how lucky it was for Jim and his friends that the—how did you call them—the Dreth were too civilized and ecologized to let themselves get polluted with some kind of pesticide that kills off vertebrate animals." ■

IN TIMES TO COME

Jerry Pournelle brings Colonel Falkenberg and his mercenaries back again next month in "Sword and Scepter," a two-part serial.

A government that turns to mercenary soldiery puts itself in a very tricky position. On the one hand, it's faced with a problem that has become serious enough to warrant military force. On the other hand, the government can't produce that military force from among its own people, so it must go out and hire the mercenaries. Many times in history, mercenary armies have put up merely a token battle and then walked away with their erstwhile employer's gold in their hands. But equally often, the mercenaries have found the local scenery pleasant, the would-be rulers of the territory soft or inept; then the mercenaries turn into conquerors, ruling both their one-time employers and their enemies.

Colonel Falkenberg knows the fears of his employers. He also knows the needs of his men. With the CoDominium about to break apart momentarily, the threat of political chaos spreading through the stars, Falkenberg wants to find a home for his men. And himself.

The cover illustration is by Jack Gaughan.

The factual article in May will be about the new breed of minicomputers, which are finally taking the computer out of the air-conditioned sanctum sanctorum of the laboratory and putting them in where the action is.

There will also be several short stories, plus all the usual departments.

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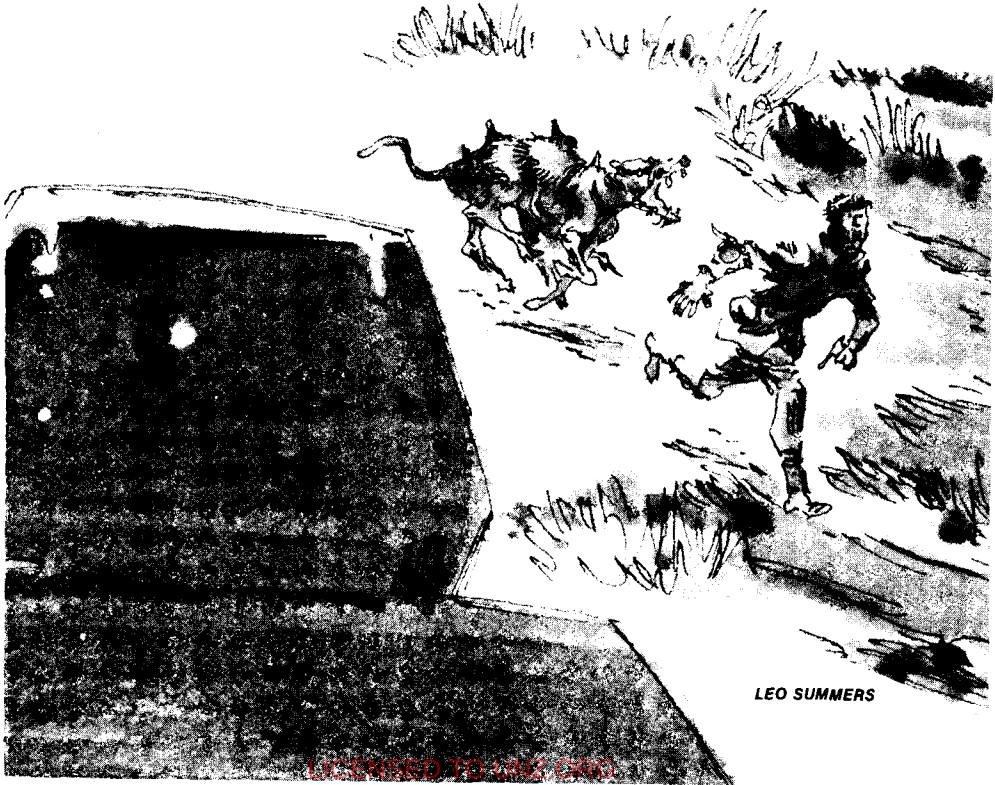
THE PEOPLE OF THE WIND

Conclusion. In the final analysis war, like life itself, obeys the Laws of Thermodynamics. You can't get something for nothing, and whatever you do will always cost just a bit more than it was worth.

POUL ANDERSON



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SYNOPSIS

Ythri is a planet, somewhat smaller than Earth but basically terrestroid, orbiting the sun Quetlan about three hundred light-years from Sol. The intelligent natives are winged, feathered, warm-blooded, but not actually birds, since they give live birth and have jaws rather than beaks. A set of gill-like antlibranchs acts as a "biological supercharger," providing the energy for the Ythrian to fly though his average mass is some twenty-five kilos and he stands not much shorter than a human. (He stands on claws at the bend of his downward-folded wings; evolution has turned the talons of his raptor ancestors into hands.) The need for a wide territory to support the resulting appetite of each individual has much affected the history of the race. So has the breeding pattern: compulsive eroticism at "lovetime" when the female ovulates, otherwise virtual asexuality. Though ovulation tends to be periodic, it can be brought on by outside factors such as emotional stress. However, marriage is an institution, which in most cultures even includes marital fidelity; couples are held together by devotion to their children, by mutual liking, and by the conveniences and requirements of society.

The planet was discovered by humans in the early days of interstellar travel. The Planha-speaking civilization upon it was quick to modernize and soon assimilated others. This happened rather easily because the basic unit of that civilization is the choth*—more than a clan, less than a nation, free to organize itself in practically any way, on any basis, that the members wish. Thus the larger framework can contain an infinite variety of life styles. To be sure, the fierce independence of the choths makes central government in the usual human sense impossible. There are Wyvans, leaders and speakers on different levels; there are meetings (Khruaths) of varying size to try cases, consider law and common policy; but everything is a matter of delicately balancing interests. Nevertheless, it works, since Ythrians lack such human traits as readiness to follow a glorified ruler.*

They expanded into space, though on a much smaller scale than man was doing. In human-dominated regions, the raw capitalism of the Polesotechnic League ended in chaos and violence. David Falkayn saw this coming, and led a group of humans into the uncorrupted Ythrian sphere. He proposed forming a joint colony on Avalon, a planet of the sun Laura, hospitable to both races, not too far from Quetlan. This was done—under Ythrian suzerainty.

In the course of centuries, mutual influence between the two races on Avalon grew until, in effect, a new, hybrid civilization was gestating. As the process accelerated, older, conservative members of either species often felt that their children were discarding a whole racial heritage.

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Undeniably, psychological problems did arise.

Meanwhile the Time of Troubles, when freebooters, barbarians, and war lords ran rampant through known space, was ridden out. Ythri restored order by tightening control over its sphere to a degree, expanding to a degree, and thus developing the Domain. From the ruins of the League came the Terran Empire, whose vigorous Caesarism made it enormously larger and stronger than the Ythrian polity, and eventually brought its boundary up against the less well-defined one of the latter. Disputes led to increasingly destructive incidents, until war looked all too likely.

The First Marchwarden—roughly corresponding to "chief of armed services"—of Avalon was FERUNE, *an Ythrian. The Second Marchwarden was a human,* DANIEL HOLM. *Those two had, over the years, nagged and maneuvered Avalon into a program of military preparedness. The other Ythrian colonies, and the mother planet, had done less; the Domain as a whole had done very little, since by its nature it left almost everything up to member societies to do for themselves.*

HOLM *was also worried about his son* CHRISTOPHER, *who had "gone bird"—adopted Ythrian ways to the extent that he was even received into a choth. (In his case it was Stormgate, whose territory was in those mountains, east of the capital city Gray, which humans called the Andromedas and Ythrians the Weathermother.) Though he still spent time in Gray to continue his studies,* CHRIS *was ever more often at Stormgate, especially with his closest friend, the female Ythrian* EYATH. *To her and his other chothmates, he was known as* ARINNIAN.

However, he was still sufficiently close to his father to share the latter's conviction that trouble lay ahead. To help organize civil defense, he traveled widely as a representative of Stormgate. This included trips to the island of St. Li, in that part of the Oronesian archipelago held by the Highsky choth. There dwelt TABITHA FALKAYN, *a young woman, a "bird" like him but much better adjusted to it. In Highsky she was called* HRILL.

CHRIS/ARINNIAN *was surprised at how taken aback he was when* EYATH *told him of her betrothal to a male of her race,* VODAN.

Meanwhile EKREM SARACOGLU *was busy. He was the Terran Empire's governor of the border sector, his seat the human-colonized planet Esperance. Under Admiral* JUAN CAJAL, *the Terran Navy was marshaling strength in the region. This distressed the admiral's daughter* LUISA. *Being attracted to her,* SARACOGLU *made soothing noises and omitted to say that he had already gotten an Imperial rescript declaring war on Ythri, to be made public when he saw fit. He did not intend to incorporate the whole Domain in the Empire, but he did intend to defeat it*

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and acquire certain of its holdings—including Avalon—in order to rectify this troublesome frontier.

Among Navy personnel was Lt. PHILIPPE ROCHEFORT, *commander of a Meteor-class fighter. His crew consisted of* ABDULLAH HELU *and the (nonhuman) Cynthian* WA CHAOU. *While on leave,* ROCHEFORT *was sharply reminded of how many Imperial citizens opposed the idea of war.*

Nor was Avalon united. In particular, MATTHEW VICKERY, *President of its Parliament of Man, spoke against the "militarism" of* FERUNE *and* DANIEL HOLM. *They could only break down his resistance to mobilization with the help of* LIAW *of The Tarns, High Wyvan and thus the most influential Ythrian on the planet.*

CHRIS/ARINNIAN *and* TABITHA/HRILL *attended a conference on defense in Centauri, the second city of Avalon. Out for relaxation afterward, they chanced upon* VODAN. *He was spending the last few hours before he reported to his space-navy unit in company with a shabby female named* QUENNA. *She was one of the rare Ythrians who could ovulate at will, a despised abnormality which usually left the sufferers no recourse but to use it as an irresistible lure in a career of prostitution.* CHRIS *expressed his disgust to* TABITHA. *She warned him that he was coming to see the females of his own race in the same light, as mere sex machines. Greatly though one could learn from aliens, it was wrong and harmful to deny one's fundamental heritage.* CHRIS *resented her remarks and they parted coolly. In the morning, he heard the news: Terra had served notice of war.*

A brilliant commander, Admiral CAJAL *had planned a quick knockout campaign which would minimize losses on both sides. It involved taking advantage of the fact that the Domain had no unified forces. The Lauran System was among the first he attacked. In a running battle, the Terrans broke the Avalonian fleet. But they got no surrender. Instead, the remaining ships fled to the outer planets to carry on guerrilla war. And when the Terrans closed in on Avalon itself, they met sheer disaster. They had had no idea of the strength of those orbital and ground-based defenses.* CAJAL *pulled back barely in time.*

Of course, the Avalonians were not unscathed. FERUNE *was fatally wounded, which put* DANIEL HOLM *in charge,* VODAN's *vessel was among those caught in its own side's fire and destroyed. First it had disabled that of* ROCHEFORT, *who happened to notice the emblem on it, in a fight where* WA CHAOU *died.* ROCHEFORT *and* HELU *made a forced landing on an island. There they were found by a Highsky patrol, among them* TABITHA/HRILL *and her chothmate* DRAUN. *He, a bloodthirsty devotee of the pagan Old Faith, killed* HELU *without need.*

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TABITHA *saved* ROCHEFORT. *Later she told him how he might well have perished simply by blundering into stands of native plants, or meeting native animals, deadly to man.*

CAJAL *called upon the Avalonians to yield.* HOLM *and* LIAW *refused. To reduce this heavily guarded planet would take so long and be so costly that the whole Terran strategy would be thrown out of gear.* CAJAL *left enough units behind to maintain a fairly effective blockade and grind down the surviving enemy spacecraft. Then he went on, deeper into the Domain where other parts of his force were successfully carrying out their assignments.*

The human communities and Ythrian choths of Avalon voted to ratify the decision to fight on. CHRIS *and* EYATH *(who had no idea* VODAN *was dead) worked hard together, which intensified their personal relationship. Among other things, they wanted to strengthen Equatoria, a continent which had never been colonized but deliberately left in its natural state.*

Unbeknownst to CHRIS, *mutual affection had been growing between* TABITHA and ROCHEFORT. *Though he was a prisoner of war, there was no particular reason to lock him up, and he was her house guest on St. Li. At last they became lovers.*

CAJAL*'s armada slashed through everything else the Domain had and reached Ythri itself. The choths there had no choice but to accept his armistice terms. These were reasonable enough; the only really harsh provision was that Terra would occupy all worlds whose ownership was in dispute or for which the Imperium considered a change of ownership desirable. This would make it certain that the eventual peace treaty would give those planets to the Empire. However, there would doubtless be compensations, and concessions on certain other points.*

On Esperance, Governor SARACOGLU *and Donna* LUISA *joined the populace in rejoicing at this quick end to the war. Then the terrible news came. Avalon would not accept occupation. Against* CAJAL*'s personal pleas and warnings, the speakers for the planet had made known that they would fight on. Though now the whole massed power of the armada could be brought to bear upon them, they intended to remain a part of the Domain of Ythri . . . which had already surrendered.*

Part 3

XIV

From the ground, Arinnian hailed Eyath. "Hoy-ah! Come on down and get inside." He grinned as he added in Anglic, "We Important Executives can't stall around."

She wheeled once more. Sunlight from behind turned her wings to a bronze fringed by golden haze. *She could be the sun itself,* he thought, *or the wind, or everything wild and beautiful above this ferroconcrete*

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desert. Then she darted at the flitter, braked in a brawl of air, and stood before him.

Her gaze fell troubled on the torpedo shape looming at his back. "Must we travel in that?" she asked.

"When we have to bounce around half a planet, yes," he replied. "You'll find it isn't bad. Especially since the hops don't take long. Less than an hour to St. Li." *To Tabby.* "Here, give me your hand."

She did. The fingers, whose talons could flay him, were slim and warm, resting trustfully between his. He led her up the gangway. She had flown in vehicles often before, of course, but always "eyeball" cars, frail and slow for the sake of allowing the cabins to be vitryl bubbles.

"This is a problem the choths like Stormgate, members mostly hunters, are going to have to overcome," he said. "Claustrophobia. You limit your travel capabilities too much when you insist on being surrounded by transparency."

Her head lifted. "If Vodan can suffer worse, I am ashamed I hung back, Arinnian."

"Actually, I hope you'll come to see what Vodan sees. He loves it in space, doesn't he?"

"Y-yes. He's told me that. Not to make a career of, but we do want to visit other planets after the war."

"Let's try today to convince you the journey as well as the goal is something special . . . Hm-m-m, do you know, Eyath, two congenial couples traveling together—well. Here we are."

He assisted her into harness in the copilot's seat, though she was his passenger. "Ordinarily this wouldn't be needful," he explained. "The flitter's spaceable—you could reach Morgana easily, the nearer planets if necessary—so it has counter-acceleration fields available, besides interior weight under free fall. But we'll be flying high, in the fringes of atmosphere, not to create a sonic boom. And while nothing much seems to be going on right now in the war, and we'll have a canopy of fortress orbits above us, nevertheless—"

She brushed her crest across his shoulder. "Of course, Arinnian," she murmured.

He secured himself, checked instruments, received clearance, and lifted. The initial stages were under remote control, to get him past that dance of negagrav projections which guarded the spaceport. Beyond, he climbed as fast as the law allowed, till in the upper stratosphere he fed his boat the power calculated to minimize his passage time.

"O-o-o-oh," Eyath breathed.

They were running quietly. The viewscreens gave outlooks in several directions. Below, Avalon was silver ocean. Around were purple twilight, sun, moon, a few stars: immensity, cold and serene.

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"You must've seen pictures," Arinnian said.

"Yes. They're not the same." Eyath gripped his arm. "Thank you, dear galemate."

And I'm bound for Tabby, to tell of a battle plan that may well work, that'll require we work together. How dare I be this happy?

They flew on in the Ythrian silence which could be so much more companionable than human chatter.

There was an overcast at their destination; but when they had pierced its fog they found the sky pearl-gray, the waters white-laced indigo, the island soft green. The landing field was small, carved on the mountainside a few kilometers from the compound where Tabitha dwelt. When Chris called ahead she had promised to meet him.

He unharnessed with fingers that shook a little. Not stopping to help Eyath, he hastened to the air lock. It had opened and the gangway had extruded. A breeze ruffled his hair, warm, damp, perfumed by the janie planted around the field. Tabitha stood near, waving at him.

That was her left hand. Her right clasped the Terran's.

After half a minute she called, "Do you figure to stand there all day, Chris?"

He came down. They released each other and extended their hands, human fashion. Meanwhile her foot caressed Rochefort's. She was wearing nothing but a few designs in body paint. They included the joyous banality of a heart pierced by an arrow.

Arinnian bowed. "We have an urgent matter to discuss," he said in Planha. "Best we flit straight to Draun's house."

As a matter of fact, Tabitha's partner and superior officer was waiting in her home. "Too many youngsters and retainers at mine," he grunted. "Secrecy must be important, or you'd simply have phoned—though we do see a rattlewing lot of you."

"These are always my welcome guests," the woman said stiffly.

Arinnian wondered if the tension he felt was in the atmosphere or his solitary mind. Draun, lean, scarred, had not erected feathers; but he sat back on tail and alatans in a manner suggesting surliness, and kept stroking a dirk he wore. Tabitha's look seemed to dwell upon Rochefort less meltingly than it had done at the field, more in appeal.

Glancing around, Arinnian found the living room little changed. Hitherto it had pleased him. She had designed the house herself. The ceiling, a fluoropanel, was low by Ythrian standards, to make the overall proportions harmonious. A few susin mats lay on a floor of polished oak, between large-windowed copperwood walls, beneath several loungers, end tables, a stone urn full of blossoms. While everything was clean-scrubbed, her usual homey clutter was strewn about, here a pipe rack

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and tobacco jar, there a book, yonder a ship model she was building.

Today, however, he saw texts to inform a stranger about Avalon, and a guitar which must have been lately ordered since she didn't play that instrument. The curtain had not been drawn across the doorway to her sleeping room; Arinnian glimpsed a new wood-and-leather-frame bed, double width.

Eyath's wing touched him. She didn't like Draun. He felt the warmth that radiated from her.

"Yes," he said. "We do have to keep the matter belowground." His gaze clanged on Rochefort's. "I understand you've been studying Planha. How far along are you?"

The Terran's smile was oddly shy for an offplanet enemy who had bedazzled a girl sometimes named Hrill. "Not very," he admitted. "I'd try a few words except you'd find my accent too atrocious."

"He's doing damn well," Tabitha said, and snuggled.

His arm about her waist, Rochefort declared: "I've no chance of passing your plans on to my side, if that's what's worrying you, Citizen—uh, I mean Christopher Holm. But I better make my position clear. The Empire *is* my side. When I accepted my commission, I took an oath, and right now I've no way to resign that commission."

"Well said," Eyath told him. "So would my betrothed avow."

"What's honor to a Terran?" Draun snorted. Tabitha gave him a furious look. Before she could reply, Rochefort, who had evidently not followed the Planha, was proceeding:

"As you can see, I . . . expect I'll settle on Avalon after the war. Whichever way the war goes. But I do believe it can only go one way. Christopher Holm, besides falling in love with this lady, I have with her planet. Could I possibly make you consider accepting the inevitable before the horror comes down on Tabby and Avalon?"

"No," Arinnian answered.

"I thought not." Rochefort sighed. "O.K., I'll take a walk. Will an hour be long enough?"

"Oh, yes," Eyath said in Anglic.

Rochefort smiled. "I love your whole people."

Eyath nudged Arinnian. "Do you need me?" she asked. "You're going to explain the general idea. I've heard that." She made a whistling noise found solely in the Avalonian dialect of Planha—a giggle. "You know how wives flee from their husbands' jokes."

"Hm-m-m?" he said. "What'll you do?"

"Wander about with Ph . . . Phee-leep Hroash For. He has been where Vodan is."

You too? Arinnian thought.

"And he is the mate of Hrill, our friend," Eyath added.

"Go if you wish," Arinnian said.

"An hour, then." Claws ticked, feathers rustled as Eyath crossed the floor to the Terran. She

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reached up and took his arm. "Come; we have much to trade," she said in her lilting Anglic.

He smiled again, brushed his lips across Tabitha's, and escorted the Ythrian away. Silence lingered behind them, save for a soughing in the trees outside. Arinnian stood where he was. Draun fleered. Tabitha sought her pipes, chose one and began stuffing it. Her eyes held very closely on that task.

"Blame not me," Draun said. "I'd have halved him like his baldskin fellow, if Hrill hadn't objected. Do you know she wouldn't let me make a goblet from the skull?"

Tabitha stiffened.

"Well, tell me when you tire of his bouncing you," Draun continued. "I'll open his belly on Illarian's altar."

She swung to confront him. The scar on her cheek stood bonelike over the skin. "Are you asking me to end our partnership?" tore from her. "Or to challenge you?"

"Tabitha Falkayn may regulate her own life, Draun," Arinnian said.

"Ar-r-rkh, could be I uttered what I shouldn't," the other male growled. His plumage ruffled, his teeth flashed forth. "Yet how long must we sit in this cage of Terran ships?"

"As long as need be," Tabitha snapped, still pale and shivering. "Do you want to charge out and die for naught, witless as any saga hero? Or invite the warheads that kindle firestorms across a whole continent?"

"Why not? All dies at last." Draun grinned. "What glorious pyrotechnics to go out in! Better to throw Terra onto hell-wind, alight; but since we can't do that, unfortunately—"

"I'd sooner lose the war than kill a planet, any planet," Tabitha said. "As many times sooner as it has living creatures. And I'd sooner lose this planet than see it killed." She leveled her voice and looked straight at the Ythrian. "Your trouble is, the Old Faith reinforces every wish to kill that war has roused in you—and you've no way to do it."

Draun's expression said, *Maybe. At least I don't rut with the enemy.* He kept mute, though, and Tabitha chose not to watch him. Instead she turned to Arinnian. "Can you change that situation?" she asked. Her smile was almost timid.

He did not return it. "Yes," he answered. "Let me explain what we have in mind."

Since the ornithoids did not care to walk any considerable distance, and extended conversation was impossible in flight, Eyath first led Rochefort to the stables. After repeated visits in recent weeks she knew her way about. A few zirraukhs were kept there, and a horse for Tabitha. The former were smaller than the latter and resembled it only in being warm-blooded

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quadrupeds—they weren't mammals, strictly speaking—but served an identical purpose. "Can you outfit your beast?" she inquired.

"Yes, now I've lived here a while. Before, I don't remember ever even seeing a horse outside of a zoo." His chuckle was perfunctory. "Uh, shouldn't we have asked permission?"

"Why? Chothfolk are supposed to observe the customs of their guests, and in Stormgate you don't ask to borrow when you're among friends."

"How I wish we really were."

She braced a hand against a stall in order to reach out a wing and gently stroke the pinions down his cheek.

They saddled up and rode side by side along a trail through the groves. Leaves rustled to the sea breeze, silvery-hued in that clear shadowless light. Hooves plopped, but the damp air kept dust from rising.

"You're kind, Eyath," Rochefort said at last, awkwardly. "Most of the people have been. More, I'm afraid, than a nonhuman prisoner of war would meet on a human planet."

Eyath sought words. She was using Anglic, for the practice as much as the courtesy. But her problem here was to find concepts. The single phrase which came to her seemed a mere tautology: "One need not hate to fight."

"It helps. If you're human, anyway," he said wryly. "And that Draun—"

"Oh, he doesn't hate you. He's always thus. I feel . . . pity? . . . for his wife. No, not pity. That would mean I think her inferior, would it not? And she endures."

"Why does she stay with him?"

"The children, of course. And perhaps she is not unhappy. Draun must have his good points, since he keeps Hrill in partnership. Still, I will be much luckier in my marriage."

"Hrill—" Rochefort shook his head. "I fear I've earned the hate of your, uh, brother Christopher Holm."

Eyath trilled. "Clear to see, you're where he especially wanted to go. He bleeds so you can hear the splashes."

"You don't mind? Considering how close you two are."

"Well, I do not watch his pain gladly. But he will master it. Besides, I wondered if she might not bind him too closely." *Sheer off from there, lass.* Eyath regarded the man. "We gabble of what does not concern us. I would ask you about the stars you have been at, the spaces you have crossed, and what it is like to be a warrior yonder."

"I don't know," Tabitha said. "Sounds damned iffy."

"Show me the stratagem that never was," Arinnian replied. "Thing is, whether or not it succeeds, we'll have changed the terms

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of the fight. The Imperials will have no reason to bombard, good reason not to, and Avalon is spared." He glanced at Draun.

The fisher laughed. "Whether I wish that or not, akh?" he said. "Well, I think any scheme's a fine one which lets us kill Terrans personally."

"Are you sure they'll land where they're supposed to?" Tabitha wondered.

"No, of course we're not sure," Arinnian barked. "We'll do whatever we can to make that area their logical choice. Among other moves, we're arranging a few defections. The Terrans oughtn't to suspect they're due to us, because in fact it is not hard to get off this planet. Its defenses aren't set against objects traveling outward."

"Hm-m-m." Tabitha stroked her chin . . . big well-formed hand over square jaw, beneath heavy mouth. . . "If *I* were a Terran intelligence officer and someone who claimed to have fled from Avalon brought me such a story, I'd put him under—what do they call that obscene gadget?—a hypnoprobe."

"No doubt." Arinnian's nod was jerky. "But these will be genuine defectors. My father has assigned shrewd men to take care of that. I don't know the details, but I can guess. We do have people who're panicked, or who want us to surrender because they're convinced we'll lose regardless. And we have more who feel that way in lesser degree, whom the first kind will trust. Suppose—well, suppose, for instance, we get President Vickery to call a potential traitor in for a secret discussion. Vickery explains that he himself wants to quit, it's political suicide for him to act openly, but he can help by arranging for certain persons to carry certain suggestions to the Terrans. Do you see? I'm not saying that's how it will be done—I really don't know how far we can trust Vickery—but we can leave the specifics to my father's men."

"And likewise the military dispositions which will make the yarn look plausible. Fine, fine," Draun gloated.

"That's what I came about," Arinnian said. "My mission's to brief the various home guard leaders and get their efforts coordinated."

Rising from his chair, he started pacing, back and forth in front of Tabitha and never looking at her. "An extra item in your case," he went on, staccato. "It'd help tremendously if one of their own brought them the same general information."

Breath hissed between her teeth. Draun rocked forward, off his alatans, onto his toes.

"Yes," Arinnian said. "Your dear Philippe Rochefort. You tell him I'm here because I'm worried about Equatoria." He gave details. "Then I find some business in the neighbor islands and belt-flit with Eyath.

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Our boat stays behind, carelessly unguarded. You let him stroll freely around, don't you? His action is obvious."

Tabitha's pipestem broke in her grasp. She didn't notice the bowl fall, scattering ash and coals. "No," she said.

Arinnian found he needn't force himself to stop and glare at her as he did. "He's more to you than your world?"

"God stoop on me if ever I make use of him," she said.

"Well, if his noble spirit wouldn't dream of abusing your trust, what have you to fear?"

"I will not make my honor unworthy of his," said Hrill.

"That dungheart?" Draun gibed.

Her eyes went to him, her hand to a table beside her whereon lay a knife.

He took a backward step. "Enough," he muttered.

It was a relief when the following stillness was broken. Someone banged on the door. Arinnian, being nearest, opened it. Rochefort stood there. Behind him were a horse and a zirraukh. He breathed unevenly and blood had retreated from under his dark skin.

"You were not to come back yet," Arinnian told him.

"Eyath—" Rochefort began.

"What?" Arinnian grabbed him by the shoulders. "Where is she?"

"I don't know. I . . . we were riding, talking. . . Suddenly she screamed. Christ, I can't get that shriek out of my head. And she took off, her wings stormed, she disappeared past the treetops before I could call to her. I . . . I waited, till—"

Tabitha joined them. She started to push Arinnian aside, noticed his stance and how his fingers dug into Rochefort's flesh, and refrained. "Phil," she said low. "Darling, think. She must've heard something terrible. What was it?"

"I can't imagine." The Terran winced under Arinnian's grip but stayed where he was. "She'd asked me to, well, describe the space war. My experiences. I was telling her of the last fight before we crash landed. I've told you the same."

"An item I didn't ask about?"

"Well, I, I did happen to mention noticing the insignia on the Avalonian boat, and she asked how it looked."

"And?"

"I told her. Shouldn't I have?"

"What was it?"

"Three gilt stars placed along a hyperbolic curve."

Arinnian let go of Rochefort. His fist smashed into the man's face. Rochefort lurched backward and fell to the ground. Arinnian drew his knife, started to pursue, curbed himself. Rochefort sat up, bewildered, bleeding at the mouth.

Tabitha knelt beside him. "You couldn't know, my dear," she said. Her own control was close to breaking. "What you told her was that her lover is dead."

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XV

Night brought rising wind. The clouds broke apart into ragged masses, their blue-black tinged by the humpbacked Morgana which fled among them. A few stars blinked hazily in and out of sight. Surf threshed in darkness beyond the beach and trees roared in darkness ashore. The chill made humans go fully clothed.

Rochefort and Tabitha paced along the dunes. "Where *is* she?" His voice was raw.

"Alone," she answered.

"In this weather? When it's likely to worsen? Look, if Holm can go out searching, at least we—"

"They can both take care of themselves." Tabitha drew her cloak tight. "I don't think Chris really expects to find her, unless she wants to be found, and that's doubtful. He simply must do something. And he has to be away from us for a while. Her grief grieves him. It's typical Ythrian to do your first mourning by yourself."

"Saints! I've bugged things good, haven't I?"

He was a tall shadow at her side. She reached through an arm-slit, groped for and found the reality of his hand. "I tell you again, you couldn't know," she said. "Anyhow, best she learn like this, instead of dragging out more weeks or months, then never being sure he didn't die in some ghastly fashion. Now she knows he went out cleanly, too fast to feel, right after he'd won over a brave foe." She hesitated. "Besides, you didn't kill him. Our own attack did. You might say the war did, like an avalanche or a lightning stroke."

"The filthy war," he grated. "Haven't we had a gutful yet?"

Rage flared. She released him. "Your precious Empire can end it any time, you know."

"It has ended, except for Avalon. What's the sense of hanging on? You'll force them to bombard you into submission."

"Showing the rest of known space what kind of thing the Empire is. That could cost them a great deal in the long run." Tabitha's anger ebbed. *O Phil, my only!* "You know we're banking on their not being monsters, and on their having a measure of enlightened self-interest. Let's not talk about it more."

"I've got to. Tabby, you and Holm—but it's old Holm, of course, and a few other old men and Ythrians, who don't care how many young die as long as they're spared confessing their own stupid, senile wilfulness—"

"Stop. Please."

"I can't. You're mounting some crazy new plan you think'll let your one little colony hold off all those stars. I say to the extent it works, it'll be a disaster. Because it may prolong the fight, sharpen it. . . No, I can't stand idly by and let you do that to yourself."

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She halted. He did likewise. They peered at each other through the unrestful wan light. "Don't worry," she said. "We know what we're about."

"Do you? What is your plan?"

"I mustn't tell you that, darling."

"No," he said bitterly, "but you can let me lie awake nights, you can poison my days, with fear for you. Listen, I know a fair amount about war. And about the psychology of the Imperial high command. I could give you a pretty good guess at how they'd react to whatever you tried."

Tabitha shook her head. She hoped he didn't see her teeth catching her lip.

"Tell me," he insisted. "What harm can I do? And my advice—Or maybe you don't propose anything too reckless. If I could be sure of that—"

She could barely pronounce it: "Please. Please."

He laid hands on her shoulders. Moonlight fell into his eyes, making them blank pools. "If you love me, you will," he said.

She stood in the middle of the wind. *I can't lie to him. Can I? But I can't break my oath either. Can I?*

What Arinnian wanted me to tell him—

But I'm not testing you, Phil. I'm . . . choosing the lesser evil . . . because you wouldn't want your woman to break her oath, would you? I'm giving you what short-lived happiness I can, by an untruth that won't make any difference to your behavior. Afterward, when you learn, I'll kneel to ask your forgiveness.

She was appalled to hear from her throat: "Do we have your parole?"

"Not to use the information against you?" His voice checked for a fractional second. Waves hissed at his back. "Yes."

"Oh, no!" She reached for him. "I never meant—"

"Well, you have my word, sweetheart mine."

In that case— she thought. *But no, I couldn't tell him the truth before I'd consulted Arinnian, who'd be sure to say no, and anyhow Phil would be miserable, in terror for me and, yes, for his friends in their navy, whom honor would not let him try to warn.*

She clenched her fists, beneath the flapping cloak, and said hurriedly: "Well, in fact it's nothing fundamental. You know about Equatoria, the uninhabited continent. Nothing's there except a few thinly scattered emplacements and a skeleton guard. They mostly sit in barracks, because that few trying to patrol that much territory is pointless. Chris has been worried."

"Hm-m-m, yes, I've overheard him mention it to you."

"He's gotten his father to agree the defenses are inadequate. In particular, making a close study, they found the Scorpeluna tableland's wide open. Surrounding mountains, air turbulence, and so

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forth, isolate it. An enemy who concentrated on breaking through the orbital fortresses and coming down fast—as soon as he was below fifty kilometers, he'd be shielded from what few rays we can project, and he could doubtless handle what few missiles and aircraft we could send in time. Once on the ground, dug in—you savvy? Bridgehead. We want to strengthen the area. That's all."

She stopped. Dizziness grabbed her. *Did I talk on a single breath?*

"I see," he responded after a while. "Thank you, dearest."

She came to him and kissed him, tenderly because of his hurt mouth.

Later that night the wind dropped, the clouds regathered, and rain fell, slow as tears. By dawn it was used up. Laura rose blindingly out of great waters, into utter blue, and every leaf and blade on the island was jeweled.

Eyath left the crag whereon she had perched the last few hours, after she could breast the weather no more. She was cold, wet, stiff at first. But the air blew keen into nostrils and antlibranchs, blood awoke, soon muscles were athrob.

Rising, rising, she thought, and lifted herself in huge upward spirals. The sea laughed but the island dreamed, and her only sound was the rush which quivered her pinions.

At your death, Vodan, you too were a sun.

Despair was gone, burned out by the straining of her wings, buffeted out by winds and washed out by rain, as he would have demanded of her. She knew the pain would be less quickly healed; but it was nothing she could not master. Already beneath it she felt the sorrow, like a hearthfire at which to warm her hands. Let a trace remain while she lived; let Vodan dwell on in her after she had come to care for another and give that later love his high-heartedness.

She tilted about. From this height she saw more than one island, strewn across the mercury curve of the world. *I don't want to return yet. Arinnian can await me till . . . dusk?* Hunger boiled in her. She had consumed a great deal of tissue. *Bless the pangs, bless this need to hunt—bless the chance, ha!*

Far below, specks, a flock of pteropleuron left their reef and scattered in search of piscoids near the water surface. Eyath chose her prey, aimed and launched herself. When she drew the membranes across her eyes toward them, the world blurred and dimmed somewhat; but she grew the more aware of a cloven sky streaming and whistling around her; claws which gripped the bend of either wing came alive to every shift of angle, speed, and power.

Her body knew when to fold those wings and fall—when to open them again, brake in thunder, whip

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on upward—when and how her hands must strike. Her dagger was not needed. The reptiloid's neck snapped at the sheer violence of that meeting.

Vodan, you'd have joyed!

Her burden was handicapping; not heavy, it had nonetheless required wide foils to upbear it. She settled on an offshore rock, butchered the meat and ate. Raw, it had a mild, almost humble flavor. Surf shouted and spouted around her.

Afterward she flew inland, slowly now. She would seek the upper plantations and rest among trees and flowers, in sun-speckled shade; later she would go back aloft; and all the time she would remember Vodan. Since they had not been wedded, she could not lead his funeral dance; so today she would give him her own, their own.

She skimmed low above an orchard. Water, steaming off leaves and ground, made small white mists across the green, beneath the sun. Upwelling currents stroked her. She drank the strong odors of living earth through antlibranchs as well as lungs, until they made her light-headed and started a singing in her blood. *Vodan,* she dreamed, *were you here beside me, we would flit off, none save us. We would find a place for you to hood me in your wings.*

It was as if he were. The beating that closed in from behind and above, the air suddenly full of maleness. Her mind spun. *Am I about to faint? I'd better set down.* She sloped unevenly and landed hard.

Orange trees stood around, not tall nor closely spaced, but golden lanterns glowed mysteriously in the deeps of their leafage. The soil was newly weeded and cultivated, bare to the sky. Its brown softness embraced her feet, damp, warmed by the sun that dazzled her. Light torrented down, musk and sweetness up, and roared.

Pinions blotted out Laura for a moment. The other descended. She knew Draun.

His crest stood stiff. Every quill around the grinning mouth said: *I hoped I might find you like this, after what's happened.*

"No," she whimpered, and spread her wings to fly.

Draun advanced stiffly over the ground, arms held wide and crook-fingered. "Beautiful, beautiful," he hawked. "Khr-r-r-r."

Her wings slapped. The inrush of air brought strength, but not her own strength. It was a different force that shook her as she might shake a prey.

"Vodan!" she yelled, and somehow flapped off the whirling earth. The lift was slow and clumsy. Draun reached up, hooked footclaws around an alatan of hers; they tumbled together.

She scratched at his face and groped for her knife. He captured both wrists and hauled her against him. "You don't really want that,

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you she," his breath gusted in her ear. "Do you now?" He brought her arms around his neck and he himself hugged her. Spread, his wings again shut out the sun, before their plumes came over her eyes.

Her clasp held him close, her wings wrapped below his. She pressed her lids together so hard that dark was full of dancing formless lights. *Vodan,* passed somewhere amidst the noise, *I'll pretend he's you.*

But Vodan would not have gone away afterward, leaving her clawed, bitten, and battered for Arinnian to find.

Tabby was still asleep, Holm still looking for his poor friend, Draun lately departed with a remark about seeing if he couldn't help, the retainers and fishers off on their various businesses. The compound lay quiet under the morning.

Rochefort stole back into the bedroom. She was among the few women he'd known who looked good at this hour. The tall body, the brown skin were too firm to sag or puff; the short fair locks tangled in a way that begged his fingers to play games. She breathed deeply, steadily, no snoring though the lips were a little parted over the whiteness beneath. When he bent above her, through bars of light and shade cast by the blind, she had no smell of sourness, just of girl. He saw a trace of dried tears.

His mouth twisted. The broken lip twinged less than his heart. She'd cried on *his* account, after they came home. "Of course you can't tonight, darling," she'd whispered, leaning over him on an elbow and running the other hand down cheek and breast and flank. "With this trouble, and you pulled ninety different ways, and everything. You'd be damned callous if you could, how 'bout that? Don't you cry. You don't know how, you make it too rough on yourself. Wait till tomorrow or the next night, Phil, beloved. We've got a lifetime."

A large subdivision of my hell was that I couldn't tell you why I was taking it so hard, he thought.

If I kiss you . . . but you might wake and—O all you saints, St. Joan who burned for her people, help me!

The knowledge came that if he dithered too long, she would indeed wake. He gave himself a slow count of one hundred before he slipped back out.

The roofs of the buildings, the peak beyond them, stood in impossible clarity against a sky which a pair of distant wings shared with the sun. The softest greens and umbers shone no less than the most brilliant red. The air was drenched in fragrances of growth and of the sea which tumbled beyond the breakwater. *No. This much beauty is unendurable.* Rochefort walked fast from the area, onto a trail among the orchards. Soon it would

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join the main road to the landing field.

I can't succeed. Someone'll be on guard; or I'll be unable to get in; or something'll happen and I'll simply have been out for a stroll. No harm in looking, is there?

Merely looking and returning for breakfast. No harm in that, except for letting her Avalonians be killed, maybe by millions, maybe including her—and, yes, my shipmates dying too—uselessly, for no reason whatsoever except pride—when maybe they can be saved. When maybe she'll see that I did what I did to end the war quickly that she might live.

The country lay hushed. Nobody had work on the plantations this time of year.

The landing field was deserted. For as scanty traffic as St. Li got, automated ground control sufficed.

The space flitter stood closed. Rochefort strangled on relief till he remembered: *Could be against no more than weather. They have no worries about thieves here.*

How about curious children?

If somebody comes along and sees me, I can explain I got worried about that. Tabby will believe me.

He wheeled a portable ramp, used for unloading cargo carriers, to the sleek hull. Mounting, his boots went knock . . . knock . . . knock. The entrance was similar to kinds he had known and he found immediately a plate which must cover an exterior manual control. It was not secured, it slid easily aside, and behind was nothing keyed to any individual or signal, only a button. He pressed it. The outer valve purred open and a gangway came forth like a licking tongue.

Father, show me Your will. Rochefort stepped across and inside.

The Ythrian vessel was quite similar to her Terran counterparts. No surprise, when you considered that the flying race learned spaceflight from man, and that on Avalon their craft must often carry humans. In the pilot room, seats and controls were adjustable for either species. The legends were in Planha, but Rochefort puzzled them out. After five minutes he knew he could lift and navigate this boat.

He smote palm into fist, once. Then he buckled down to work.

XVI

Arinnian carried Eyath back to the compound on foot. His gravbelt wouldn't safely raise them both and he left it behind. Twice she told him she could fly, or walk at any rate, but in such a weak whisper that he said, "No." Otherwise they did not speak, after the few words she had coughed against his breast while he knelt to hold her.

He couldn't carry that mass long in his arms. Instead, she clung to him, keelbone alongside his back, foot-claws curved over his shoulders, hugging his waist, like a small

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Ythrian child except that he must help her against the heaviness of the planet by his clasp on her alatans. He had cut his shirt into rags to sponge her hurts with rainwater off the leaves, and into bandages to stop further bleeding. The injuries weren't clinically serious, but it gave him something to use his knife on. Thus the warmth (the heat) and silk featheriness of her lay upon his skin; and the smell of her lovetime, like heavy perfume, was around him and in him.

That's the worst, he kept thinking. *The condition'll last for days—a couple of weeks, given reinforcement. If she encounters him again—*

Is she remorseful? How can she be, for a thing she couldn't halt? She's stunned, of course, harmed, dazed; but does she feel mortally befouled? Ought she to?

Suddenly I don't understand my galemate.

He trudged on. There had been scant rest for him during his search. He ached, his mouth was dry, his brain seemed full of sand. the world was a path he had to walk, so-and-so many kilometers long, except that the kilometers kept stretching. This naturally thinned the path still more, until the world had no room left for anything but a row of betrayals. He tried to shut out consciousness of them by reciting a childish chant in his head for the benefit of his feet. "You *pick* 'em *up* an' *lay* 'em *down*. You *pick* 'em *up*—" But this made him too aware of feet, how they hurt, knees, how they shivered, arms, how they burned, and perforce he went back to the betrayals. Terra-Ythri. Ythri-Avalon. Tabitha-Rochefort. Eyath-Draun, no, Draun-Eyath . . . Vodan-what's-her-name, that horrible creature in Centauri, yes, Quenna . . . Eyath-anybody, because right now she was anybody's . . . no, a person had self-control, forethought, a person could stay chaste if not preserve that wind-virginity which had been hers . . . Those hands clasped on his belly, which had lain in his, had lately strained to pull Draun closer; that voice which had sung to him, and was now stilled, had moaned like the voice of any slut—

Stop that! Stop, I say!

Sight of the compound jarred him back to a sort of reality. No one seemed about. Luck. He'd get Eyath safely put away. Ythrian chemists had developed an aerosol which effectively nullified the pheromones, and doubtless some could be borrowed from a neighbor. It'd keep the local males from strutting and gawking outside her room, till she'd rested enough to fly with him to the boat and thence home to Stormgate.

Tabitha's house stood open. She must have heard his footsteps and breath, for she came to the door. "Hullo," she called. "You found her? . . . Hoy!" She ran. He supposed once he would have appreciated the sight. "She O.K.?"

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"No." He plodded inside. The coolness and shade belonged to a different planet.

Tabitha padded after. "This way," she suggested. "My bed."

"No!" Arinnian stopped. He would have shrugged if he weren't burdened. "Why not?"

Eyath lay down, one wing folded under her, the other spread wide so the pinions trailed onto the floor. The nictitating membranes made her appear blind. "Thank you." She could barely be heard.

"What happened?" Tabitha bent to see. The odor that a male Ythrian could catch across kilometers reached her. "Oh." She straightened. Her jaw set. "Yeh."

Arinnian sought the bathroom, drank glass after glass of cold water, showered beneath the iciest of the needle-spray settings. That and a stimpill brought him back to alertness. Meanwhile Tabitha went in and out, fetching supplies for Eyath's care.

When they were both finished, they met in the living room. She put her lips close to his ear—he felt the tiny puffs of her words—to say very low: "I gave her a sedative. She'll be asleep in a few minutes."

"Good," he answered out of his hatred. "Where's Draun?"

Tabitha stepped back. The green gaze widened. "Why?"

"Can't you guess? Where is he?"

"Why do you want Draun?"

"To kill him."

"You won't!" she cried. "Chris, if it was him, they couldn't help themselves. Neither could. You know that. Shock and grief brought on premature ovulation, and then he chanced by—"

"He didn't chance by, that slime," Arinnian said. "Or if he did, he could've veered off from the first faint whiff he got, like any decent male. He most certainly didn't have to brutalize her. Where is he?"

Tabitha moved sidewise, in front of the phone. She had gone paler than when Draun mocked her. He shoved her out of his way. She resisted a moment, but while she was strong, she couldn't match him. "At home, you've guessed," Arinnian said. "A bunch of friends to hand, armed."

"To keep you from trying anything reckless, surely," Tabitha pleaded. "Chris, we've a war. He's too important in the guard. We—if Phil were here you'd never— Must I go after a gun?"

He sat down. "Your stud couldn't prevent me calling from a different place," he snapped. She recoiled. "Nor could your silly gun. Be quiet."

He knew the number and stabbed it out. The screen came to life: Draun and, yes, a couple more in the background, blasters at their sides. The Ythrian spoke at once: "I expected this. Will you hear me? Done's done, and no harm in it. Choth law says not, in cases like this, save that a gild may be asked

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for wounded pride and any child must be provided for. There'll hardly be a brat, from this early in her season, and as for pride, she enjoyed herself." He grinned and stared past the man. "Didn't you, prettytail?"

Arinnian craned his neck around. Eyath staggered from the bedroom. Her eyes were fully open but glazed by the drug which had her already half unconscious. Her arms reached toward the image in the screen. "Yes. Come," she croaked. "No. Help me, Arinnian. Help."

He couldn't move. It was Tabitha who led her back out of sight.

"You see?" Draun said. "No harm. Why, you humans can force your females, and often do, I've heard. I'm not built for that. Anyhow, what's one bit of other folk's sport to you, alongside your hundred or more each year?"

Arinnian had kept down his vomit. It left a burning in his gullet. His words fell dull and, in his ears, remote, though every remaining sense had become preternaturally sharp. "I saw her condition."

"Well, maybe I did get a bit excited. Your fault, really, you humans. We Ythrians watch your ways and begin to wonder. You grip my meaning? All right, I'll offer gild for any injuries, as certified by a medic. I'll even discuss a possible pride-payment, with her parents, that is. Are you satisfied?"

"No."

Draun bristled his crest a little. "You'd better be. By law and custom, you've no further rights in the matter."

"I'm going to kill you," Arinnian said.

"What? Wait a wingbeat! Murder—"

"Duel. We've witnesses here. I challenge you."

"You've no cause, I say!"

Arinnian could shrug, this time. "Then you challenge me."

"What for?"

The man sighed. "Need we plod through the formalities? Let me see, what deadly insults would fit? The vulgarism about what I can do when flying above you? No, too much a cliché. I'm practically compelled to present a simple factual description of your character, Draun. Thereto I will add that Highsky Choth is a clot of dung, since it contains such a maggot."

"Enough," the Ythrian said, just as quietly though his feathers stood up and his wings shuddered. "You are challenged. Before my gods, your gods, the memory of all our forebears and the hope of all our descent, I, Draun of Highsky, put you, Christopher Holm, called Arinnian of Stormgate, upon your deathpride to meet me in combat from which no more than one shall go alive. In the presence and honor of these witnesses whom I name—"

Tabitha came from behind. By force and surprise, she hauled Arinnian off his chair. He fell to

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the floor, bounced erect, and found her between him and the screen. Her left hand fended him off, her right was held as if likewise to keep away his enemy, her partner.

"Are you both insane?" she nearly screamed.

"The words have been uttered." Draun peeled his fangs. "Unless he beg grace of me."

"I would not accept a plea for grace from him," Arinnian said.

She stood panting, swinging her head from each to each. The tears poured down her face; she didn't appear to notice. After some seconds her arms dropped, her neck drooped.

"Will you hear me, then?" she asked hoarsely. They held still. Arinnian had begun to tremble under a skin turning cold. Tabitha's fists closed where they hung. "It's not to your honor that you let th-th-those persons your choths . . . Avalon . . . needs . . . be killed or, or crippled. Wait till war's end. I challenge you to do that."

"Well, aye, if I needn't meet nor talk to the Walker," Draun agreed reluctantly.

"If you mean we must cooperate as before," Arinnian said to Tabitha, "you'll have to be our go-between."

"How can she?" Draun jeered. "After the way you bespoke her choth."

"I think I can, somehow," Hrill sighed.

She stood back. The formula was completed, and the screen blanked.

Strength poured from Arinnian. He turned to the girl and said, contrite, "I didn't mean that last. Of you I beg grace, to you I offer gild."

She didn't look his way, but sought the door and stared outward. *Toward her lover,* he thought vaguely. *I'll find a tree to rest beneath till Eyath rouses and I can transport her to the flitter.*

A crash rolled down the mountainside and rattled the windows. Tabitha grew rigid. The noise toned away, more and more faint as the thunderbolt fled upward. She ran into the court. "Phil!" she shouted. *Ah,* Arinnian thought. *Indeed. The next betrayal.*

"At ease, Lieutenant. Sit down."

The dark, good-looking young man stayed tense in the chair. Juan Cajal dropped gaze back to desk and rattled the papers in his hands. Silence brimmed his office cabin. *Valenderay* swung in orbit around Pax at a distance which made that sun no more than the brightest of the stars, whose glare curtained Esperance where Luisa waited.

"I have read this report on you, including the transcription of your statements, with care, Lt. Rochefort," Cajal said finally, "long though it be. That's why I had you sent here by speedster."

"What can I add, sir?" The newcomer's voice was stiff as his body.

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However, when Cajal raised his look to meet those eyes again, he remembered a gentle beast he had once seen on Nuevo México, in the Sierra de los Bosques Secos, caught at the end of a canyon and waiting for the hunters.

"First," the admiral said, "I want to tender my personal apology for the hypnoprobing to which you were subjected when you rejoined our fleet. It was no way to treat a loyal officer."

"I understand, sir," Rochefort said. "I wasn't surprised, and the interrogators were courteous. You had to be sure I wasn't lying." Briefly, something flickered behind the mask. "To you."

"Hm-m-m, yes, the hypnoprobe evokes every last detail, doesn't it? The story will go no further, son. You saw a higher duty and followed."

"Why fetch me in person, sir? What little I had to tell must be in that report."

Cajal leaned back. He constructed a friendly smile. "You'll find out. First I need a bit of extra information. What do you drink, Lieutenant?"

Rochefort started. "Sir?"

"Scotch, bourbon, rye, gin, tequila, vodka, aquavit, et cetera, including miscellaneous extraterrestrial bottles. What mixes and chasers? I believe we've a reasonably well-stocked cabinet aboard." When Rochefort sat dumb, Cajal finished: "I like a martini before dinner myself. We're dining together, you realize."

"I am? The. the admiral is most kind. Yes. A martini. Thanks."

Rochefort called in the order. Actually he took a small sherry, on the rare occasions when he chose anything, and he suspected Rochefort likewise had a different preference. But it was important to get the boy relaxed.

"Smoke?" he invited. "I don't, but I don't mind either, and the governor gave me those cigars. He's a noted gourmet."

"Uh . . . thank you . . . not till after eating, sir."

"Evidently you're another." Cajal guided the chitchat till the cocktails arrived. They were large and cold. He lifted his. *"A vuestra salud, mi amigo."*

"Your health—" The embryo of a smile lived half a second in Rochefort's countenance. *"Bonne santé Monsieur l'Amiral."*

They sipped. "Go ahead, enjoy," Cajal urged. "A man of your proven courage isn't afraid of his supreme boss. Your immediate captain, yes, conceivably; but not me. Besides, I'm issuing you no orders. Rather, I ask for what help and advice you care to give."

Rochefort had gotten over being surprised. "I can't imagine what, sir." Cajal set him an example by taking a fresh sip. Cajal's, in a glass that bore his crest, had been watered.

Not that he wanted Rochefort

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drunk. He did want him loosened and hopeful.

"I suppose you know you're the single prisoner to escape," the admiral said. "Understandable. They probably hold no more than a dozen or two, from boats disabled like yours, and you were fabulously lucky. Still, you may not know that we've been getting other people from Avalon."

"Defectors, sir? I heard about discontent."

Cajal nodded. "And fear, and greed, and also more praiseworthy motives, a desire to make the best of a hopeless situation and avoid further havoc. They've been slipping off to us, one by one, a few score total. Naturally, all were quizzed, even more thoroughly than you. Your psychoprofile was on record; Intelligence merely established it hadn't been tampered with."

"They wouldn't do that, sir," Rochefort said. Color returned to his speech. "About the worst immorality you can commit on Avalon is stripping someone else of his basic honor. That costs you yours." He sank back and took a quick swallow. "Sorry, sir."

"Don't apologize. You spoke in precisely the vein I wish. Let me go on, though. The first fugitives hadn't much of interest to tell. Of late—well, no need for lectures. One typical case will serve. A city merchant, grown rich on trade with nearby Imperial worlds. *He* won't mind us taking over his planet, as long as the war doesn't ruin his property and the aftermath cost him extra taxes. Despicable, or realistic? No matter. The point is, he possessed certain information, and had certain other information given him to pass on, by quite highly placed officials who're secretly of the peace group."

Rochefort watched Cajal over the rim of his glass. "You fear a trap, sir?"

Cajal spread his palms. "The fugitives' sincerity is beyond doubt. But were they fed false data before they left? Your story is an important confirmation of theirs."

"About the Equatorian continent?" Rochefort said. "No use insulting the admiral's intelligence. I probably would not have tried to get away if I didn't believe what I'd heard might be critical. However, I know very little."

Cajal tugged his beard. "You know more than you think, son. For instance, our analysis of enemy fire patterns, as recorded at the first battle of Avalon, does indicate Equatoria is a weak spot. Now you were on the scene for months. You heard them talk. You watched their faces, faces of people you'd come to know. How concerned would you say they really were?"

"Hm-m-m . . ." Rochefort drank anew. Cajal unobtrusively pressed a button which signaled the demand for a refill for him. "Well, sir, the, the lady I was with, Equatoria was

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out of her department." He hastened onward: "Christopher Holm, oldest son of their top commander, yes, I'd say he worried about it a lot."

"What's the place like? Especially this, ah, Scorpeluna region. We're collecting what information we can, but with so many worlds around, who that doesn't live on them cares about their desert areas?"

Rochefort recommended a couple of books. Cajal didn't remind him that Intelligence's computers must have retrieved these from the libraries days or weeks ago. "Nothing too specific," the lieutenant went on. "I've gathered it's a large, arid plateau, surrounded by mountains they call high on Avalon, near the middle of the continent, which the admiral knows isn't big. Some wild game, perhaps, but no real hope of living off the country." He stopped for emphasis. "Counterattackers couldn't either."

"And they, who have oceans to cross, would actually be further from home than our people from our ships," Cajal murmured.

"A dangerous way down, sir."

"Not after we'd knocked out the local emplacements. And those lovely, sheltering mountains—"

"I thought along the same lines, sir. From what I know of, uh, available production and transportation facilities, and the generally sloppy Ythrian organization, they can't put strong reinforcements there fast. Whether or not my escape alarms them."

Cajal leaned over his desk. "Suppose we did it," he said. "Suppose we established a base for aircraft and ground-to-ground missiles. What do you think the Avalonians would do?"

"They'd have to surrender, sir," Rochefort answered promptly. "They . . . I don't pretend to understand the Ythrians, but the human majority—well, my impression is that they'll steer closer to a *Götterdämmerung* than we would, but they aren't crazy. If we're there, on land, if we can shoot at everything they have, not in an indiscriminate ruin of their beloved planet—that prospect is what keeps them at fighting pitch—but if we can do it selectively, laying our own bodies on the line—" He shook his head. "My apologies. That got tangled. Besides, I could be wrong."

"Your impressions bear out every xenological study I've seen," Cajal told him. "Furthermore, yours come from a unique experience." The new drink arrived. Rochefort demurred. Cajal said: "Please do take it. I want your free-wheeling memories, your total awareness of that society and environment. This is no easy decision. What you can tell me certainly won't make up my mind by itself. However, any fragment of fact I can get, I must."

Rochefort regarded him closely.

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"You want to invade, don't you, sir?" he asked.

"Of course. I'm not a murder machine. Neither are my superiors."

"I want us to. Body of Christ--" Rochefort signed himself before the crucifix-- "how I want it!" He let his glass stand while he added: "One request, sir. I'll pass on everything I can. But if you do elect this operation, may I be in the first assault group? You'll need some Meteors."

"That's the most dangerous, Lieutenant," Cajal warned. "We won't be sure they have no hidden reserves. Therefore we can't commit much at the start. You've earned better."

Rochefort took the glass, and had it been literally that instead of vitryl, his clasp would have broken it. "I request precisely what I've earned, sir."

XVII

The Imperial armada englobed Avalon and the onslaught commenced.

Once more ships and missiles hurtled, energy arrows flew, fireballs raged and died, across multiple thousands of kilometers. This time watchers on the ground saw those sparks brighten, hour by hour, until at last they hurt the eyes, turned the world momentarily livid and cast stark shadows. The fight was moving inward.

Nonetheless it went at a measured pace. Cajal had hastened his decision and brought in his power as fast as militarily possible--within days--lest the enemy get time to strengthen that vulnerable country of theirs. But now that he was here, he took no needless risks. Few were called for. This situation was altogether different from the last. He had well-nigh thrice his former might at hand, and no worries about what relics of the Avalonian navy might still skulk through the dark reaches of the Lauran System. Patrols reported instrumental indications that these were gathering at distances of one or two astronomical units. Since they showed no obvious intention of casting themselves into the furnace, he saw no reason to send weapons after them.

He did not even order the final demolition of Ferune's flagship, when the robots within knew their foe and opened fire. She was floating too distantly, she had too little ammunition or range left her, to be worth the trouble. It was easier to bypass the poor old hulk and the bones which manned her.

Instead he concentrated on methodically reducing the planetary defense. Its outer shell was the fortresses, some great, most small, on sentry-go in hundreds of orbits canted at as many angles to the ecliptic. They had their advantages *vis-a-vis* spaceships. They could be continually resupplied from below.

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Nearly all of them wholly automated, they were less versatile but likewise less fragile than flesh and nerve. A number of the least had gone undetected until their chance came to lash out at a passing Terran.

That, though, had been at the first battle. Subsequently the besieging sub-fleet had charted each, destroyed no few and forestalled attempts at replacement. Nor could the launching of salvos from the ground be again a surprise. And ships in space had their own advantages, such as mobility.

Cajal's general technique was to send squadrons by at high velocity and acceleration. As they entered range of a target they unleashed what they had and immediately applied unpredictable vectors to escape return fire. If the first pass failed, a second quickly followed, a third, a fourth . . . until defense was saturated and the station exploded in vapor and shards. Having no cause now to protect his rear or his supply lines, Cajal could be lavish with munitions, and was.

Spacecraft in that kind of motion were virtually hopeless goals for missiles which must rise through atmosphere, against surface gravity, from zero initial speed. The Avalonians soon realized as much and desisted for the time being.

Cajal's plan did not require the preliminary destruction of every orbital unit. That would have been so expensive that he would have had to hang back and wait for more stocks from the Empire; and he was in a hurry. He did decide it was necessary to neutralize the moon, and for a while Morgana was surrounded and struck by such furies that mountains crumbled and valleys ran molten.

Otherwise, on the whole, the Imperials went after those fortresses which, in their ever-changing configurations, would menace his first landing force on the date set by his tactical scheme. In thus limiting his objective, he was enabled to focus his full energies sharply. Those incandescent hours, running into a pair of Avalonian days, were the swiftest penetration ever made of defenses that strong.

Inevitably, he took losses. The rate grew when his ships started passing so close above the atmosphere that ground-based projectors and missile sites became effective. The next step was to nullify certain of these, together with certain other installations.

Captain Ion Munteanu, commanding fire control aboard H.M.S. *Phobos,* briefed his officers while the ship rushed forward.

"Ours is a special mission, as you must have guessed from this class of vessel being sent. We aren't just going to plaster a spot that's been annoying the boys. We're after a city. I see a hand. Question, Ensign Ozawa?"

"Yes, sir. Two. How and why?

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We can loose enough torps and decoys, sophisticated enough, that if we keep it up long enough, a few are bound to duck in and around the negafields and burst where they'll do some good. That's against a military target. But surely they've given their cities better protection than that."

"I remind you about eggs and grandmothers, Ensign. Of course they have. Powerful, complicated set-ups, plus rings of exterior surface-to-space launchers. We'll be firing our biggest and best, programmed for detonation at high substratospheric altitude. The pattern I'm about to diagram should allow one, at least, to reach that level before it's intercepted. If not, we start over."

"Sir! You don't mean a continent buster!"

"No, no. Calm down. Remember this ship couldn't accommodate any. We have no orders to damage His Majesty's real estate beyond repair. Ours will be heavy brutes, true, but clean, and shaped to discharge their output straight ahead, mainly in the form of radiation. Blast wouldn't help much against the negafields. We'll whiff the central part of town, and Intelligence tells me the fringes are quite flammable."

"Sir, I don't want to annoy you, but why do we do it?"

"Not wantonly, Ozawa. A landing is to be made. Planetside warfare may go on for a while. This particular town, Centauri they call it, is their chief seaport and industrial capital. We are not going to leave it to send stuff against our friends."

Sweat stood on Ozawa's brow. "Women and children—"

"If the enemy has any sense, he evacuated nonessential persons long ago," Munteanu snapped. "Frankly, I don't give a curse. I lost a brother here, last time around. If you're through sniveling, let's get to work."

Quenna flapped slowly above the Livewell Street canal. Night had fallen, a clear night unlike most in the Delta's muggy winters. Because of that and the blackout, she could see stars. They frightened her. Too many of the cold, nasty little things. And they weren't only that, she was told. They were suns. War came from them, war that screwed up the world.

Fine at first, lots of Ythrians passing through, jingle in their purses, moments when she forgot all except the beauty of the male and her love for him; in between, she could afford booze and dope to keep her happy, especially at parties. Parties were a human idea, she'd heard. (Who was it had told her? She tried to remember the face, the body. She would be able to, if they didn't blur off into the voices and music and happy-making smoke.) A good idea. Like war had seemed. Love, love, love,

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laugh, laugh, laugh, sleep, sleep, sleep, and if you wake with your tongue tasting bad and needles in your head, a few pills will soon put you right.

Except it went sour. No more Navy folk. The Nest empty, a cave, night after night after night, till a lass was ready to scream except that the taped music did that for her. Most humans moving out, too, and those who stayed—she'd even have welcomed human company—keeping underground. The black, quiet nights, the buzzing aloneness by day, the money bleeding off till she could barely buy food, let alone a bottle or a pill to hold off the bad dreams.

Flap, flap. Somebody must be in town and lonesome, now the fighting had started again. "I'm lonesome too," she called. "Whoever you are, I love you." Her voice sounded too loud in this unmoving warm air, above these oily waters and dead pavements, between those shadowy walls and beneath those terrible little stars.

"Vodan?" she called more softly. She remembered him best of the Navy folk, almost as well as the first few who had used her, more years back than she cared to count. He'd been gentle and bothered about his lass at home, as if that dragglewing deserved him. But she was being silly, Quenna was. No doubt the stars had eaten Vodan.

She raised her crest. She had her deathpride. She would not be frightened in the midnight streets. Soon dawn would break and she could dare sleep.

The sun came very fast.

She had an instant when it filled the sky. Night caught her then, as her eyeballs melted. She did not know this, because her plumage was on fire. Her scream drowned out the following boom, when superfast molecules of air slipped by the negafields, and she did not notice how it ruptured eardrums and smashed capillaries. In her delirium of pain, there was nothing except the canal. She threw herself toward it, missed, and fell into a house which stood in one blaze. That made no difference, since the canal waters were boiling.

Apart from factors of morale and war potential, the strike at Centauri must commit a large amount of Avalonian resources to rescue and relief. It had been well timed. A mere three hours later, the slot which had been prepared in the defenses completed itself and the first wave of invasion passed through.

Rochefort was in the van. He and his hastily assembled crew had had small chance to practice, but they were capable men and the Meteor carried out her assignment with an *élan* he wished he could feel. They ran interference for the lumbering gunships till these were below the dangerous altitude. En route, they stopped a pair of

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enemy missiles. Though no spacecraft was really good in atmosphere, a torpedo boat combined acceptable maneuverability, ample firepower, and more than ample wits aboard. Machines guided by simple robots were no match.

Having seen his charges close to ground, Rochefort took his vessel, as per assignment, against the source of the missiles. It lay beyond the mountains, in the intensely green gorge of a river. The Terran boats roared one after the next, launched beams and torpedoes against negafields and bunkers, stood on their tails and sprang to the stratosphere, swept about and returned for the second pass. No third was needed. A set of craters gaped between cliffs which sonic booms had brought down in rubble. Rochefort wished he could forget how fair that canyon had been.

Returning to Scorpeluna, he found the whole convoy landed. Marines and engineers were swarming from personnel transports, machines from the freighters. Overhead, patrol craft darkened heaven. They were a frantic few days that followed. Hysteria was never far below the skin of purposeful activity. Who knew for certain what the enemy had?

Nothing came. The screen generators were assembled and started. Defensive projectors and missiles were positioned. Sheds were put together for equipment, afterward for men. And no counterattack was made.

Airborne scouts and spaceborne instruments reported considerable enemy activity on the other continents and across the islands. Doubtless something was being readied. But it didn't appear to pose any immediate threat.

The second slot opened. The second wave flowed down, entirely unopposed. Scorpeluna Base spread like an inkblot.

His intention now being obvious, Cajal had various other orbital fortresses destroyed, in order that slots come more frequently. Thereafter he pulled his main fleet back a ways. From it he poured men and equipment groundward.

The last Avalonian ships edged nearer, fled from sorties, returned to slink about, wolves too starveling to be a menace. No serious effort was wasted on them. The essential was to exploit this tacit cease-fire while it lasted. On that account, the Imperials everywhere refrained from offensive action. They worked at digging in where they were and at building up their conquest until it could not merely defend itself, it could lift an irresistible fist above all Avalon.

Because he was known to have the favor of the grand admiral, Lt. Philippe Rochefort (newly senior grade) got his application for continued planetside duty approved. Since there was no further call for

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a space torpedo craft, he found himself flying aerial patrol in a two-man skimmer, a glorified grav-sled.

His assigned partner was a marine corporal, Ahmed Nasution, nineteen standard years old, fresh off New Djawa and into the Corps. "You know, sir, everybody told me this planet was a delight," he said, exaggerating his ruefulness to make sure his superior got the point. "Join the Navy and see the universe, eh?"

"This area isn't typical," Rochefort answered shortly.

"What is," he added, "on an entire world?"

The skimmer flew low above the Scorpelunan plateau. The canopy was shut against broiling air. A Hilsch tube arrangement and self-darkening vitryl did their inadequate best to combat that heat, brazen sky, bloated and glaring sun. The only noises were hum of engine, whirr of passage. Around the horizon stood mountain peaks, dim blue and unreal. Between reached emptiness. Bushes, the same low, reddish-leaved, medicinal-smelling species wherever you looked, grew widely apart on hard red earth. The land was not really flat. It raised itself in gnarly mesas and buttes, it opened in great dry gashes. At a distance could be seen a few six-legged beasts, grazing in the shade of their parasol membranes. Otherwise nothing stirred save heat shimmers and dust devils.

"Any idea when we'll push out of here?" Nasution asked, reaching for a water bottle.

"When we're ready," Rochefort told him. "Easy on the drink. We've several hours to go, you and I."

"Why doesn't the enemy give in, sir? A bunch of us in my tent caught a 'cast of theirs—no orders not to, are there?—a 'cast in Anglic. I couldn't understand it too well, their funny accent and, uh, phrases like 'the Imperials have no more than a footgrip,' you have to stop and figure them out and meanwhile the talking goes on. But Gehenna, sir, we don't *want* to hurt them. Can't they be reasonable and—"

"Sh!" Rochefort lifted an arm. His monitoring radio identified a call. He switched to that band.

"Help! O God, help!—Engineer Group Three . . . wild animals . . . estimate thirty-four kilometers north-northwest of camp—*Help!"*

Rochefort slewed the skimmer about.

He arrived in minutes. The detail, ten men, in a groundcar, had been running geological survey to determine the feasibility of blasting and fuse-lining a large missile silo. They were armed, but had looked for no troubles except discomfort. The pack of dog-sized hexapodal lopers found them several hundred meters from their vehicle.

Two men were down and being devoured. Three had scattered in terror, seeking to reach the car, and

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been individually surrounded. Rochefort and Nasution saw one overwhelmed. The rest stood firm, back to back, and maintained steady fire. Yet those scaly-bristly shapes seemed almost impossible to kill. Mutilated, they dragged their jaws onward.

Rochefort yelled into his transmitter for assistance, swooped, and cut loose. Nasution wept but did good work at his gun. Nevertheless, two more humans were lost before the lycosauroids had been slain.

After that, every group leaving camp got an aerial escort, which slowed operations elsewhere.

"No, Doctor, I've stopped believing it's psychogenic." The major glanced out of the dispensary shack window, to an unnaturally swift sunset which a dust storm made the color of clotted blood. Night would bring relief from the horrible heat . . . in the form of inward-gnawing chill. "I was ready to believe that at first. Your psychodrugs aren't helping any longer, though. And more and more men are developing the symptoms, as you must know better than I. Bellyache, diarrhea, muscle pains, more thirst than this damned dryness will account for. Above all, tremors and fuzzy-headedness. I hate to tell you how necessary a job I botched today."

"I'm having my own troubles thinking." The medical officer passed a hand across his temple. It left a streak of grime, despite the furnace air sucking away sweat before that could form drops. "Frequent blurred vision too? Yes."

"Have you considered a poison in the environment?"

"Certainly. You weren't in the first wave, Major. I was. Intelligence, as well as history, assured us Avalon is acceptably safe. Still, take my word, we'd scarcely established camp when the scientific team was checking."

"How about quizzing Avalonian prisoners?"

"I'm assured this was done. In fact, there've been subsequent commando operations just to collect more for that purpose. But how likely are any except a few specialists to know details about the most forbidding part of a whole continent that nobody inhabits?"

"And of course the Avalonians would have all those experts safely tucked out of reach." The major gusted a weary breath. "So what did your team find?"

The medical officer groped for a stimpill out of the open box on his desk. "There is a, ah, high concentration of heavy metals in local soil. But nothing to worry about. You could breathe the dust for years before you'd require treatment. The shrubs around use those elements in their metabolism, as you'd expect, and we've warned against chewing or burning any part of them. No organic compounds test out as allergens. Look,

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human and Ythrian biochemistries are so similar the races can eat most of each other's food. If this area held something spectacularly deadly, don't you imagine the average colonist would have heard of it, at least? I'm from Terra—middle west coast of North America—oh, Lord—" For a while his gaze was gone from Scorpeluna. He shook himself. "We lived among oleanders. We cultivated them for their flowers. Oleanders are poisonous. You just need to be sensible about them."

"This has got to have some cause," the major insisted.

"We're investigating," the medic said. "If anyone had foreseen this planet would amount to anything militarily—it'd have been studied before ever we let a war happen, so thoroughly— Too late."

Occasional small boats from the Avalonian remnants slipped among the Terran blockaders at high velocity and maximum variable acceleration. About half were destroyed; the rest got through and returned spaceward. It was known that they exchanged messages with the ground. Given suitable encoding and laser beams, a huge amount of information can be passed in a second or two.

"Obviously they're discussing a move," Cajal snarled at his staff. "Equally obviously, if we try to hunt them, they'll scatter and vanish in sheer distance, sheer numbers of asteroids and moons, same's they did before. And they'll have contingency plans. I do not propose to be diverted, gentlemen. We shall keep our full strength here."

For a growing body of observations indicated that, on land and sea, under sea and in their skies, the colonists were at last making ready to strike back.

Rochefort heard the shrieking for the better part of a minute before it registered on him. *Dear Jesus,* dragged through his dullness, *what ails me?* His muscles protested bringing the skimmer around. His fingers were sausages on the control board. Beside him, Nasution slumped mute, as the boy had been these past days (weeks? years?). The soft cheeks had collapsed and were untidily covered by black down.

Still, Rochefort's craft arrived to help those which had been floating above a ground patrol. The trouble was, it could then do no more than they. Energy weapons incinerated at a flash hundreds of the cockroach-like things, twenty centimeters long, whose throngs blackened the ground between shrubs. They could not save the men whom these bugs had already reached and were feasting on. Rochefort carefully refrained from noting which skimmer pilots gave, from above, a *coup de grace.* He himself hovered low and hauled survivors aboard. After what he had seen, in his

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present physical shape, Nasution was too sick to be of use.

Having evidently gotten wind of meat in this hungry land, the kakkelaks swarmed toward the main base. They couldn't fly, but they clattered along astonishingly fast. Every effort must go to flaming a cordon against them.

Meanwhile the Avalonians landed throughout Equatoria. They deployed so quickly and widely—being very lightly equipped—that bombardment would have been futile. All who entered Scorpeluna were Ythrian.

The chief officers of medicine and planetology confronted their commandant. Outside, an equinoctial gale bellowed and rang through starless night; dust scoured over shuddering metal walls. The heat seemed to come in enormous dry blasts.

"Yes, sir," the medical chief said. Being regular Navy rather than marine, he held rear admiral's rank. "We've proven it beyond reasonable doubt." He sighed, a sound lost in the noise. "If we'd had better equipment, more staff— Well, I'll save that for the board of inquiry, or the court-martial. The fact is, poor information got us sucked into a death trap."

"Too many worlds." The civilian planetologist shook his gaunt head. "Each too big. Who can know?"

"While you gabble," the commandant said, "men lie in delirium and convulsions. More every day. Talk." His voice was rough with anger and incomplete weeping.

"We suspected heavy metal poisoning, of course," the medical officer said. "We made repeated tests. The concentration always seemed within allowable limits. Then overnight—"

"Never mind that," the planetologist interrupted. "Here are the results. These bushes growing everywhere around . . . we knew they take up elements like arsenic and mercury. And the literature has described the hell shrub, with pictures, as giving off dangerous vapors. What we did not know is that here *is* a species of hell shrub. It looks entirely unlike its relatives. Think of roses and apples. Besides, we'd no idea how the toxin of the reported kind works, let alone these. That must have been determined after the original descriptions were published, when a purely organic compound was assumed. The volume of information in every science, swamping—" His words limped to a halt.

The commandant waited.

The medical officer took the tale: "The vapors carry the metals in loose combination with a . . . a set of molecules, unheard of by any authority I've read. Their action is, well, they block certain enzymes. In effect, the body's protections are canceled. No metal atoms whatsoever are excreted. Every microgram goes to the vital organs.

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Meanwhile the patient is additionally weakened by the fact that parts of his protein chemistry aren't working right. The effects are synergistic and exponential. Suddenly one crosses a threshold."

"I . . . see . . ." the commandant said.

"We top officers aren't in too bad a condition yet," the planetologist told him. "Nor are our staffs. We spend most of our time indoors. The men, though—" He rubbed his eyes. "Not that I'd call myself a well man," he mumbled.

"What do you recommend?" the commandant asked.

"Evacuation," the medical chief said. "And I don't recommend it, I tell you we have no alternative. Our people must get immediate proper care."

The commandant nodded. Himself sick, monstrously tired, he had expected some such answer days ago and started his preparations.

"We can't lift off tomorrow," he said in his dragging tones. "We haven't the bottom; most's gone back to space. Besides, a panicky flight would make us a shooting gallery for the Avalonians. But we'll organize to raise the worst cases, while we recall everybody to the main camp. We'll have more ships brought down, in orderly fashion." He could not control the twitch in his upper lip.

As the Imperials retreated, their enemies struck.

They fired no ground-to-ground missiles. Rather, their human contingents went about the construction of bases which had this capability, at chosen spots throughout the Equatorian continent. It was not difficult. They were only interested in short-range weapons, which needed little more than launch racks, and in aircraft, which needed little more than maintenance shacks for themselves and their crews. The largest undertaking was the assembly of massive energy projectors in the peaks overlooking Scorpeluna.

Meanwhile the Ythrians waged guerrilla warfare on the plateau. They, far less vulnerable to the toxicant peculiar to it, were in full health and unburdened by the spacesuits, respirators, handkerchiefs which men frantically donned. Already winged, they need not sit in machines which radar, gravar, magnetoscopes could spot across kilometers. Instead they could dart from what cover the ground afforded, spray a trudging column with fire and metal, toss grenades at a vehicle, sleet bullets through any skimmers, and be gone before effective reaction was possible.

Inevitably, they had their losses.

"Hya-a-a-ah!" yelled Draun of Highsky, and swooped from a crag down across the sun-blaze. At the bottom of a dry ravine, a Terran column stumbled toward camp from a half-finished emplacement.

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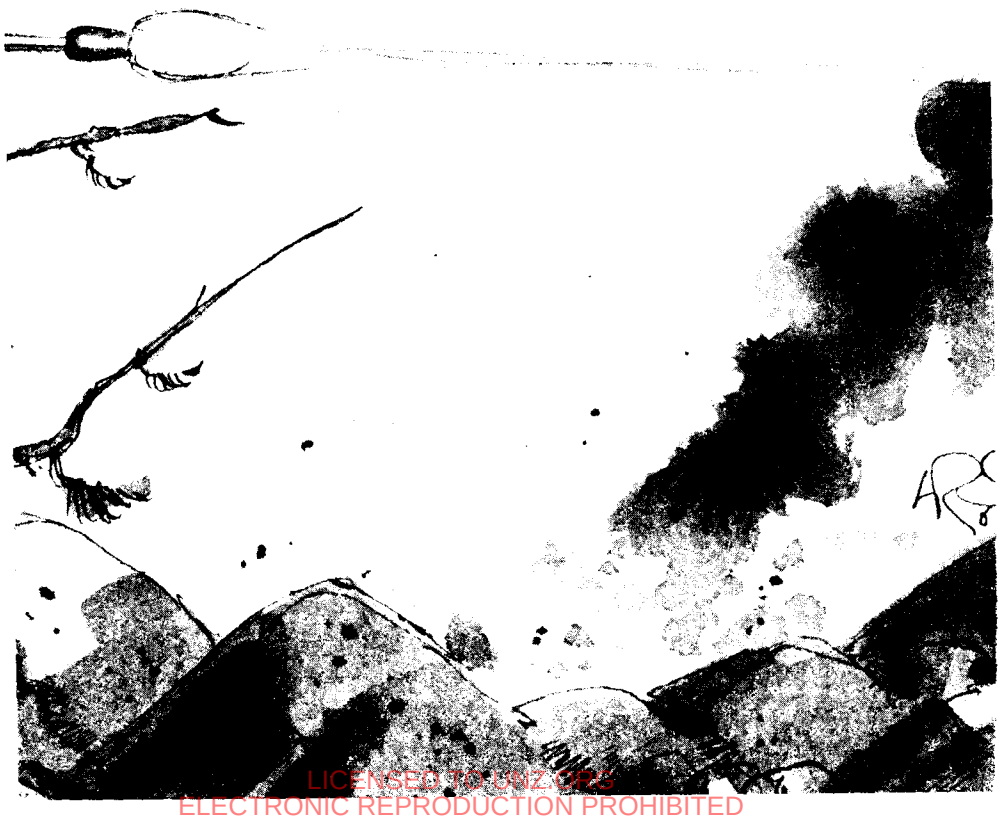
Dust turned every man more anonymous than what was left of his uniform. A few armored groundcars trundled among them, a few aircraft above. A gravsled bore rapidly mummifying corpses, stacked.

"Cast them onto hell-wind!" The slugthrower stuttered in Draun's grasp. Recoil kept trying to hurl him off balance, amidst these wild thermals. He gloried that his wings were too strong and deft for that.

The Ythrians swept low, shooting, and onward. Draun saw men fall like emptied sacks. Wheeling beyond range, he saw their comrades form a square, anchored by its cars and artillery, helmeted by its flyers. *They're still brave*, he thought, and wondered if they hadn't best be left alone. But the idea had been to push them into close formation, then on the second pass drop a tordenite bomb among them. "Follow me!"

The rush, the bullets and energy bolts, the appallingly known wail at his back. Draun braked, came about, saw Nyesslan, his oldest son, the hope of his house, spiral to ground on a wing and a half. The Ythrian squadron rushed by. *"I'm coming, lad!"* Draun glided down beside him. Nyesslan lay unconscious. His blood purpled the dust. The second attack failed, broke up in confusion before it won near to



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the square. True to doctrine, that they should hoard their numbers, the Ythrians beat back out of sight. A platoon trotted toward Draun. He stood above Nyesslan and fired as long as he was able.

"Take out everything they have remaining in orbit," Cajal said. "We need freedom to move our transports continuously."

His chief of staff cleared throat. "Hr-r-rm, the admiral knows about the hostile ships?"

"Yes. They're accelerating inward. It's fairly clear that all which can make planetfall hope to do so; the rest are running interference."

"Shouldn't we organize an interception?"

"We can't spare the strength. Clearing away those forts will empty most of our magazines. Our prime duty is to pull our men out of that mess we . . . I . . . sent them into." Cajal stiffened himself. "If any units can reasonably be spared from the orbital work, yes, let them collect what Avalonians they can, provided they conserve munitions to the utmost and rely mainly on energy weapons. I doubt they'll get many. The rest we'll have to let go their ways, perhaps to our sorrow." His chuckle clanked. "As old professor Wu-Tai was forever saying at the Academy—remember, Jim?—'The best foundation that a decision is ever allowed is our fallible assessment of the probabilities.' "

The tropical storms of Avalon were more furious than one who came from a planet of less irradiation and slower spin could well have imagined. For a day and a night, the embarkation of the sickest men was postponed. Besides the chance of losing a carrier, there was a certainty that those flensing rains would kill some of the patients as they were borne from shacks to gangways.

The more or less hale, recently landed, battled to erect levees. Reports, dim and crackling through radio static, were of flash floods leaping down every arroyo.

Neither of these situations concerned Rochefort. He was in an intermediate class, too ill for work, too well for immediate removal. He huddled on a chair among a hundred of his fellows, in a stinking, steaming bunker, tried to control the chills and nausea that went ebb-and-flow through him, and sometimes thought blurrily of Tabitha Falkayn and sometimes of Ahmed Nasution, who had died three days before.

What Avalonian spacecraft ran the gauntlet descended to Equatoria, where home guard officers assigned them their places.

The storm raged to its end. The first Imperial vessels lifted from the wrecked base. They were warships, probing a way for the crammed, improvised hospital hulls which were to follow. Sister fighters

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moved in from orbit to join them.

Avalon's ground and air defenses opened crossfire. Her space force entered battle.

Daniel Holm sat before a scanner. It gave his words and his skull visage to the planet's most powerful linked transmitters, a broadcast which could not fail to be heard:

"—we're interdicting their escape route. You can't blast us in time to save what we estimate as a quarter-million men. Even if we didn't resist, maybe half of them would never last till you brought them to adequate care. And I hate to think about the rest—organ, nerve, brain damage beyond the power of regenerative techniques to heal.

"*We* can save them. We of Avalon. We have the facilities prepared, clear around our planet. Beds, nursing staffs, diagnostic equipment, chelating drugs, supportive treatments. We'd welcome your inspection teams and medical personnel. Our wish is not to play political games with living people. The minute you agree to renew the cease-fire and to draw your fleet far enough back that we can count on early warning, that same minute our rescue groups will take flight for Scorpeluna."

XVIII

The ward was clean and well-run, but forty men must be crowded into it and there was no screen—not that local programs would have interested most of them. Hence they had no entertainment except reading and bitching. A majority preferred the latter. Before long, Rochefort asked for earcups in order that he might be able to use the books lent him. He wore them pretty much around the clock.

Thus he did not hear the lickerish chorus. His first knowledge came from a touch on his shoulder. *Huh?* he thought. *Lunch already?* He raised his eyes from "The Gaiila Folk" and saw Tabitha.

The heart sprang in him and raced. His hands shook so he could barely remove the cups.

She stood athwart the noisy, antiseptic-smelling room as if her only frame were a window behind, open to the blue and blossoms of springtime. A plain coverall disguised the curves and straightness of her. He saw in the countenance that she had lost weight. Bones stood forth still more strongly than erstwhile, under a skin more darkened and hair more whitened by a stronger sun than shone over Gray.

"Tabby," he whispered.

She took his hands, not pressing them nor smiling much. "Hullo, Phil," said the remembered throaty voice. "You're looking better'n I expected, when they told me you'd three tubes in you."

"You should have seen me at the beginning." He heard his words waver. "How've you been? How's everybody?"

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"I'm all right. Most of those you knew are. Draun and Nyesslan bought it."

"I'm sorry," he lied.

Tabitha released him. "I'd have come sooner," she said, "but had to wait for furlough, and then it took time to get a data scan on those long lists of patients and time to get transportation here. We've a lot of shortages and disorganization yet." Her regard was green and grave. "I did feel sure you'd be on Avalon, dead or alive. Good to learn it was alive."

"How could I stay away . . . from you?"

She dropped her lids. "What is your health situation? The staff's too busy to give details."

"Well, when I'm stronger they want to ship me to a regular Imperial Navy hospital, take out my liver and grow me a new one. I may need a year, Terran, to recover completely. They promise me I will."

"Splendid." Her tone was dutiful. "You being well treated here?"

"As well as possible, considering. But, uh, my roommates aren't exactly my type and the medics and helpers, both Imperial and Avalonian, can't stop their work for conversation. It's been damned lonesome, Tabby, till you came."

"I'll try to visit you again. You realize I'm on active duty, and most of what leave I'm granted has to be spent at St. Li, keeping the business in shape."

Weakness washed through him. He leaned back into the pillows and let his arms fall on the blanket. "Tabby . . . would you consider waiting . . . that year?"

She shook her head, slowly, and again met his stare. "Maybe I ought to pretend till you're more healed, Phil. But I'm no good at pretending, and besides, you rate better."

"After what I did—"

"And what I did." She leaned down and felt past the tubes to lay palms on his shoulders. "No, we've never hated on that account, have we, either of us?"

"Then can't we both forgive?"

"I believe we've already done it. Don't you see, though? When the hurting had died down to where I could think, I saw there wasn't anything left. Oh, friendship, respect, memories to cherish. And that's all."

"It isn't enough . . . to rebuild on?"

"No, Phil. I understand myself better than I did before. If we tried, I know what sooner or later I'd be doing to you. And I won't. What we had, I want to keep clean."

She kissed him gently and raised herself.

They talked awhile longer, embarrassed, until he could dismiss her on the plea, not entirely untruthful, that he needed rest. When she was gone he did close his eyes, after donning the earcups which

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shut out all the Terran voices.

She's right, probably, he thought. *And my life isn't blighted. I'll get over this one too, I suppose.* He recalled a girl in Fleurville and hoped he would be transferred to an Esperancian hospital, when or if the cease-fire became a peace.

Outside, Tabitha stopped to put on the gravbelt she had retrieved from the checkroom. The building had been hastily erected on the outskirts of Gray. (She remembered the protests when Marchwarden Holm diverted industrial capacity from war production to medical facilities, at a time when renewed combat seemed imminent. Commentators pointed out that what he had ordered was too little for the casualties of extensive bombardment, too much for those of any plausible lesser-scale affray. He had growled, "We do what we can" and rammed the project through. It helped that the principal home guard officers urged obedience to him. They knew what he really had in mind—these men whose pain kept the weapons uneasily silent.) Where she stood, a hillside sloped downward, decked with smaragdine susin, starred with chasuble bush and Buddha's cup, to the strewn and begardened city, the huge curve of uprising shoreline, the glitter on Falkayn Bay. Small cottony clouds sauntered before the wind, which murmured and smelled of livewell.

She inhaled that coolness. After Equatoria, it was intoxicating. Or it ought to be. She felt curiously empty.

Wings boomed. An Ythrian landed before her. "Good flight to you, Hrill," the female greeted.

Tabitha blinked. Who—? Recognition came. "Eyath! To you, good landing." *How dull her tone, how sheenless her plumes. I haven't seen her since that day on the island . . .* Tabitha caught a taloned hand in both of hers. "This is wonderful, dear. Have you been well?"

Eyath's stance and feathers and membranes drawn over her eyes gave answer. Tabitha hunkered down and embraced her.

"I sought you," Eyath mumbled. "I spent the battle at home; afterward too, herding, because I needed aloneness and they told me the planet needs meat." Her head lay in Tabitha's bosom. "Lately I've been freed of that and came to seek—"

Tabitha stroked her back, over and over.

"I learned where you were posted and that you'd mentioned you would stop in Gray on your furlough," Eyath went on. "I waited. I asked of the hotels. Today one said you had arrived and gone out soon after. I thought you might have come here, and trying was better than more waiting."

"What little I can do for you, galemate, tell me."

"It is hard." Eyath clutched

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Tabitha's arms, painfully, without raising her head. "Arinnian is here too. He has been for some while, working on his father's staff. I sought him and—" A strangled sound, though Ythrians do not weep.

Tabitha foresaw: "He avoids you."

"Yes. He tries to be kind. That is the worst, that he must try."

"After what happened—"

"Ka-a-a-ah. I am no more the same to him." Eyath gathered her will. "Nor to myself. But I hoped Arinnian would understand better than I do."

"Is he the solitary one who can help? What of your parents, siblings, chothmates?"

"They have not changed toward me. Why should they? In Stormgate a, a misfortune like mine is reckoned as that, a misfortune, no disgrace, no impairment. They cannot grasp what I feel."

"And you feel it because of Arinnian. I see." Tabitha looked across the outrageously lovely day. "What can I do?"

"I don't know. Maybe nothing. Yet if you could speak to him—explain—beg grace of him for me—"

Anger lifted. "*Beg* him? Where is he?"

"At work, I suppose. His home—"

"I know the address." Tabitha released her and stood up. "Come, lass. No more talk. We're off for a good hard flight in this magnificent weather, and I'll take advantage of being machine-powered to wear you out, and at day's end we'll go to wherever you're staying and I'll see you asleep."

Twilight fell, saffron hues over silver waters, elsewhere deep blue and the earliest stars. Tabitha landed before Arinnian's door. His windows glowed. She didn't touch the chime plate, she slammed a panel with her fist.

He opened. She saw he had also grown thin, mahogany hair tangled above tired features and disheveled clothes. "Hrill!" he exclaimed. "Why . . . I never . . . Come in, come in."

She brushed past him and whirled about. The chamber was in disarray, obviously used only for sleeping and bolted meals. He moved uncertainly toward her. Their contacts had been brief, correct, and by phone until the fighting began. Afterward they verified each other's survival, and that was that.

"I'm, I'm glad to see you, Hrill," he stammered.

"I don't know as I feel the same," she rapped. "Sit down. I've got things to rub your nose in, you sanctimonious mudbrain."

He stood a moment, then obeyed. She saw the strickenness upon him and abruptly had no words. They looked, silent, for minutes.

Daniel Holm sat before the

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screens which held Liaw of The Tarns, Matthew Vickery of the Parliament, and Juan Cajal of the Empire. A fourth had just darkened. It had carried a taped plea from Trauvay, High Wyvan of Ythri, that Avalon yield before worse should befall and a harsher peace be dictated to the whole Domain.

"You heard, sirs?" Cajal asked.

"We have heard," Liaw answered.

Holm felt the pulse in his breast and temples, not much quickened but a hard, steady slugging. He longed for a cigar—unavailable—or a drink—unadvisable—or a year of sleep—unbroken. *At that,* crossed his mind, *we're in better shape than the admiral. If ever I saw a death's head, it rides his shoulderboards.*

"What say you?" Cajal went on like an old man.

"We have no wish for combat," Liaw declared, "or to deepen the suffering of our brethren. Yet we cannot give away what our folk so dearly bought for us."

"Marchwarden Holm?"

"You won't renew the attack while we've got your people here," the human said roughly. "Not that we'll hold them forever. I told you before, we don't make bargaining counters out of thinking beings. Still, the time and circumstances of their release have to be negotiated."

Cajal's glance shifted to the next screen. "President Vickery?"

A politican's smile accompanied the response: "Events have compelled me to change my opinion as regards the strategic picture, Admiral. I remain firm in my opposition to absolutist attitudes. My esteemed colleague, Governor Saracoglu, has always impressed me as being similarly reasonable. You have lately returned from a prolonged conference with him. Doubtless many intelligent, well-informed persons took part. Did no possibility of compromise emerge?"

Cajal sagged. "I could argue and dicker for days," he said. "What's the use? I'll exercise my discretionary powers and lay before you at once the maximum I'm authorized to offer."

Holm gripped the arms of his chair.

"The governor pointed out that Avalon can be considered as having already met most terms of the armistice," crawled from Cajal. "Its orbital fortifications no longer exist. Its fleet is a fragment whose sequestration, as required, would make no real difference to you. Most important, Imperial units *are* now on your planet.

"Nothing is left save a few technicalities. Our wounded and our medics must be given the acknowledged name of occupation forces. A command must be established over your military facilities; one or two men per station will satisfy that requirement while posing no threat of takeover should the truce

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come apart. Et cetera. You see the general idea."

"The saving of face," Holm grunted. "Uh-huh. Why not? But how about afterward?"

"The peace treaty remains to be formulated," said the drained voice. "I can tell you in strict confidence, Governor Saracoglu has sent to the Imperium his strongest recommendation that Avalon not be annexed."

Vickery started babbling. Liaw held stiff. Holm gusted a breath and sat back.

They'd done it. They really had.

The talk would go on, of course. And on and on and on, along with infinite petty particulars and endless niggling. No matter. Avalon would stay Ythrian—stay free.

I ought to whoop, he thought. *Maybe later. Too tired now.*

His immediate happiness, quiet and deep, was at knowing that tonight he could go home to Rowena.

XIX

There were no instant insights, no dramatic revelations and reconciliations. But Arinnian was to remember a certain hour.

His work for his father had stopped being very demanding. He realized he should use the free time he had regained to phase back into his studies. Then he decided that nothing was more impractical than misplaced practicality. Tabitha agreed. She got herself put on inactive duty. Eventually, however, she must return to her island and set her affairs in order, if only for the sake of her partner's family. Meanwhile he was still confined to Gray.

He phoned Eyath at her rented room: "Uh, would you, uh, care to go for a sail?"

Yes, she said with every quill.

Conditions were less than perfect. As the boat left the bay, rain came walking. The hull skipped over choppy olive-dark waves, tackle athrum; water slanted from hidden heaven, long spears which broke on the skin and ran down in cool splinters, rushing where they entered the sea.

"Shall we keep on?" he asked.

"I would like to." Her gaze sought land, a shadow aft. No other vessels were abroad, nor any flyers. "It's restful to be this alone."

He nodded. He had stripped, and the cleanness dwelt in his hair and sluiced over his flesh.

She regarded him from her perch on the cabin top, across the cockpit which separated them. "You had something to tell me," she said with two words and her body.

"Yes." The tiller thrilled between his fingers. "Last night, before she left—" In Planha he need speak no further.

"Galemate, galemate," she breathed. "I rejoice." She half extended her wings toward him, winced, and withdrew them.

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"For always," he said, his voice filled with awe.

"I could have wished none better than Hrill, for you," Eyath replied. Scanning him closer: "You remain in fret."

He bit his lip.

Eyath waited.

"Tell me," he forced forth, staring at the deck. "You see us from outside. Am I able to be what she deserves?"

She did not answer at once. Startled not to receive the immediate yes he had expected, Arinnian lifted his eyes to her silence. He dared not interrupt her thought. Waves boomed, rain laughed.

Finally she said, "I believe she is able to make you able."

He nursed the wound. Eyath began to apologize, summoned resolution and did not. "I have long felt," she told him, "that you needed someone like Hrill to show you that—show you how—what is wrong for my folk is right, is the end and meaning of life, for yours."

He mustered his own courage to say, "I knew the second part of that in theory. Now she comes as the glorious fact. Oh, I was jealous before. I still am, maybe I will be till I die, unable to help myself. She, though, she's worth anything it costs. What I am learning, Eyath, my sister, is that she is not you and you are not her, and it is good that you both are what you are."

"She has given you wisdom." The Ythrian hunched up against the rain.

Arinnian saw her grief and exclaimed, "Let me pass the gift on. What befell you—"

She raised her head to look wildly upon him.

"Was that worse than what befell her?" he challenged. "I don't ask for pity"—human word—"because of past foolishness, but I do think my lot was more hard than either of yours, the years I wasted imagining bodily love can ever be bad, imagining it has any real difference from the kind of love I bear to you, Eyath. Now we'll have to right each other. I want you to share my hopes."

She sprang down from the cabin, stumbled to him and folded him in her wings. Her head she laid murmuring against his shoulder. Raindrops glistened within the crest like jewels of a crown.

The treaty was signed at Fleurville on a day of late winter. Little ceremony was involved and the Ythrian delegates left almost at once. "Not in very deep anger," Ekrem Saracoglu explained to Luisa Cajal, who had declined his invitation to attend. "By and large, they take their loss philosophically. But we couldn't well ask them to sit through our rituals." He drew on his cigarette. "Frankly, I too was glad to get off that particular hook."

He had, in fact, simply made a

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televised statement and avoided the solemnities afterward. A society like Esperance's was bound to mark the formal end of hostilities by slow marches and slower thanksgiving services.

That was yesterday. The weather continued mild on this following afternoon, and Luisa agreed to come to dinner. She said her father felt unwell, which, regardless of his liking and respect for the man, did not totally displease Saracoglu.

They walked in the garden, she and he, as often before. Around paths which had been cleared, snow decked the beds, the bushes and boughs, the top of the wall, still white although it was melting, here and there making thin chimes and gurgles as the water ran. No flowers were left outdoors, the air held only dampness, and the sky was an even dove-gray. Stillness lay beneath it, so that footfalls scrunched loud on gravel.

"Besides," he added, "it was a relief to see the spokesman for Avalon and his cohorts board their ship. The secret service men I'd assigned to guard them were downright ecstatic."

"Really?" She glanced up, which gave him a chance to dwell on luminous eyes, tip-tilted nose, lips always parted as if in a child's eagerness. But she spoke earnestly—too earnestly, too much of the time, damn it. "I knew there had been some idiot anonymous death threats against them. Were you that worried?"

He nodded. "I've come to know my dear Esperancians. When Avalon dashed their original jubilation—well, you've seen and heard the stuff about 'intransigent militarists'." He wondered if his fur cap hid his baldness or reminded her of it. Maybe he should break down and get a scalp job.

Troubled, she asked, "Will they ever forget . . . both sides?"

"No," he said. "I do expect grudges will fade. We've too many mutual interests, Terra and Ythri, to make a family fight into a blood feud. I hope."

"We *were* more generous than we had to be. Weren't we? Like letting them keep Avalon. Won't that count?"

"It should." Saracoglu grinned on the left side of his mouth, took a final acrid puff and tossed his cigarette away. "Though everybody sees the practical politics involved. Avalon proved itself indigestible. Annexation would have spelled endless trouble, whereas Avalon as a mere enclave poses no obvious difficulties such as the war was fought to terminate. Furthermore, by this concession, the Empire won some valuable points with respect to trade that might otherwise not have been feasible to insist on."

"I know," she said, a bit impatiently.

He chuckled. "You also know I like to hear myself talk."

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She grew wistful. "I'd love to visit Avalon."

"Me too. Especially for the sociological interest. I wonder if that planet doesn't foreshadow the distant future."

"How?"

He kept his slow pace and did not forget her arm resting on his; but he squinted before him and said out of his most serious thought, "The biracial culture they're creating. Or that's creating itself; you can't plan or direct a new current in history. I wonder if that wasn't the source of their resistance—like an alloy or a two-phase material, many times stronger than either part that went into it. We've a galaxy, a cosmos to fill—"

My, what a mixed bag of metaphors, including this one, gibed his mind. He laughed inwardly, shrugged outwardly, and finished: "Well, I don't expect to be around for that. I don't even suppose I'll have to meet the knottier consequences of leaving Avalon with Ythri."

"What could those be?" Luisa wondered. "You just said it was the only thing to do."

"Indeed. I may be expressing no more than the natural pessimism of a man whose lunch at Government House was less than satisfactory. Still, one can imagine. The Avalonians, both races, are going to feel themselves more Ythrian than the Ythrians. I anticipate future generations of theirs will supply the Domain with an abnormal share, possibly most of its admirals. Let us hope they do not in addition supply it with revanchism. And under pacific conditions, Avalon, a unique world uniquely situated, is sure to draw more than its share of trade—more important, brains, which follow opportunity. The effects of that are beyond foreseeing."

Her clasp tightened on his sleeve. "You make me glad I'm not a statesman."

"Not half as glad as I am that you're not a statesman," he said, emphasizing the last syllable. "Come, let's drop these dismal important matters. Let's discuss—for example, your tour of Avalon. I'm sure it can be arranged, a few months hence."

She turned her face from him. When the muteness had lasted a minute, he stopped, as did she. "What's the matter?" he asked, frightened.

"I'm leaving, Ekrem," she said. "Soon. Permanently."

"What?" He restrained himself from seizing her.

"Father. He sent in his resignation today."

"I know he . . . has been plagued by malicious accusations. You recall I wrote to Admiralty Center."

"Yes. That was nice of you." She met his eyes again.

"No more than my duty, Luisa." The fear would not leave him, but he was pleased to note that he

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spoke firmly and maintained his second-best smile. "The Empire needs good men. No one could have predicted the Scorpeluna disaster, nor done more after the thing happened than Juan Cajal did. Blaming him, calling for court-martial, is wizened spite, and I assure you nothing will come of it."

"But he blames himself," she cried low.

I have no answer to that, he thought.

"We're going back to Nuevo México," she said.

"I realize," he attempted, "these scenes may be unduly painful to him. Need you leave, however?"

"Who else has he?"

"Me. I, ah, will presumably get an eventual summons to Terra—"

"I'm sorry, Ekrem." Her lashes dropped over the delicate cheekbones. "Terra would be no good either. I won't let him gnaw away his heart alone. At home, among his own kind, it will be better." She smiled, not quite steadily, and tossed her head. "*Our* kind. I admit a little homesickness myself. Come visit us sometime." She chose her words: "No doubt I'll be getting married. I think, if you don't mind, I think I'd like to name a boy for you."

"Why, I would be honored beyond anything the Emperor could hang on this downward-slipping chest of mine," he said automatically. "Shall we go inside? The hour's a trifle early for drinks, perhaps; on the other hand, this is a special occasion."

Ah, well, he thought above the pain, *the daydream was a pleasant guest, but now I am freed from the obligations of a host. I can relax and enjoy the games of governor, knight, elevated noble, Lord Advisor, retired statesman dictating interminable and mendacious memoirs.*

Tomorrow I must investigate the local possibilities with respect to bouncy and obliging ladies. After all, we are only middle-aged once.

Summer dwelt in Gray when word reached Avalon. There had been some tension—who could really trust the Empire?—and thus joy amid the human population exploded in festival.

Bird, Christopher Holm and Tabitha Falkayn soon left the merriment. Announcements, ceremonies, feasts could wait; they had decided that the night of final peace would be their wedding night.

Nonetheless they felt no need of haste. That was not the way of the choths. Rather, two sought to become one with their world, their destiny, and their dead—whether in waiting for lovetime or in love itself—until all trouble had been mastered and they could freely become one with each other.

Beyond the northern headland, the hills were as yet uninhabited, though plants whose ancestral seeds arrived with the pioneers had here long ceased to be foreign. Chris

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and Tabby landed in a sunset whose red and gold ran berserk above a quiet sea. They pitched camp, ate, drank a small glass of wine and a long kiss; afterward, hand in hand, they walked a trail which followed the ridge.

On their left, as daylight smoldered away, grasses wherein clustered trefoil and sword-of-sorrow fell steeply down to the waters. These glimmered immense, out to a horizon which lost itself in a sky deepening from violet to crystalline black. The evening star stood as a candle among the awakening constellations. On their right was forest, darkling, still sweet from odors of pine. A warm small breeze made harp vines ring and brightness twinkle among the jewelleafs.

"Eyath?" she asked once.

"Homebound," he answered.

That, and his tone and the passage of his mouth across her dimly seen hair, said: *In showing me I must heal her, and how, you healed me, my darling.*

Her fingertips, touching his cheek, said: *To my own gladness, which grew and grew.*

Nevertheless he sensed a question in her. He thought he knew what it was. It had often risen in him; but he, the reader, philosopher, poet, could inquire of the centuries better than she, whose gift was to understand the now.

He did not press her to voice it. Enough for this hour, that she was here and his.

Morgana rose, full, murky-spotted and less bright than formerly. So much had it been scarred. Tabby halted.

"Was it worth it?" she said. He heard the lingering anguish.

"The war, you mean?" he prompted.

"Yes." Her free arm rose. "Look there. Look everywhere—around this globe, out to those suns—death, maiming, agony, mourning, ruin—losses like that yonder, things we've cheated our children of—to make a political point!"

THE ANALYTICAL LABORATORY

January 1973

PLACE	TITLE	AUTHOR	POINTS
1.	Integration Module	*Daniel B. James*	2.37
2.	Cemetery World (Conc.)	*Clifford D. Simak*	2.66
3.	Health Hazard	*Howard L. Myers*	3.04
4.	A Thing of Beauty	*Norman Spinrad*	3.51
5.	Proud Guns to the Sea	*Duncan Lunan*	4.85
6.	Year 3 of the Shark	*Joel S. Witkin*	5.00
7.	One Plus One Equals Eleven	*G. C. Edmondson*	5.92

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"I've wondered too," he confessed. "Remember, though, we did keep something for the children that they'd otherwise have lost. We kept their right to be themselves."

"You mean to be what we are. Suppose we'd been defeated. We nearly were. The next generation would have grown up as reasonably contented Imperial subjects. Wouldn't they have? So had we the right in the first place to do what we did?"

"I've decided yes," he said. "Not that any simple principle exists, *and not that I couldn't be wrong.* But it seems to me—well, that which we are, our society or culture or what you want to name it, has a life and a right of its own."

He drew breath. "Best beloved," he said, "if communities didn't resist encroachments, they'd soon be swallowed by the biggest and greediest. Wouldn't they? In the end, dead sameness. No challenges, no inspirations from somebody else's way. What service is it to life if we let that happen?

"And, you know, enmities needn't be eternal. I daresay, oh, for instance, Governor Saracoglu and Admiral Cajal had ancestors on opposite sides at Lepanto." He saw that she didn't grasp his reference. No matter, she followed his drift. "The point is, both strove, both resisted, both survived to give something to the race, something special that none else could have given. Can't you believe that here on Avalon we've saved part of the future?"

"Bloodstained," she said.

"That wasn't needful," he agreed. "And yet, we sophonts being what we are, it was unavoidable. Maybe someday there'll be something better. Maybe, even, this thing of ours, winged and wingless together, will help. We'll keep trying, of course."

"And we do have peace for a while," she whispered.

"Can't we be happy in that?" he asked.

Then she smiled through moonlit tears and said, "Yes, Arinnian, Chris, dearest of all," and sought him.

Eyath left Gray before dawn.

At that hour, after the night's revel, she had the sky to herself. Rising, she captured a wind and rode it further aloft. It flowed, it sang. The last stars, the sinking moon turned sea and land into mystery; ahead, sharp across whiteness, lifted the mountains of home.

It was cold, but that sent the blood storming within her.

She thought: *He who cared for me and he who got me share the same honor. Enough.*

Muscles danced, wings beat, alive to the outermost pinion. The planet spun toward morning. *My brother, my sister have found their joy. Let me go seek my own.*

Snowpeaks flamed. The sun stood up in a shout of light.

High is heaven and holy. ■

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POLIMANDER'S MAN-THING

A creature well-fitted to its environment needs no tools. It's only the weak, the unfit, who change the world.

BY PAT DE GRAW

Polimander fled before the wind-blown ice-sand. The wind forced the crystals into his fur, stung his naked, indented crown, lowered his twitching antenna across the nape of his neck. Polimander struggled against the force, his usually placid body shaken by waves of physical hysteria. He rolled himself up tightly, and for a short distance allowed the heavy-handed wind to bowl him over the flat delta land.

At a specific point, the primal sense in Polimander told him he had come to the end of his journey. Before him, in the grit clouds, stood the conical upheaval of tightly packed crystals, three times his own height. At the pinnacle, a hole bored down through the cone, into the solid matter below. Polimander's chubby, vestigially-digited hands clung awkwardly to the sides of the cone. He struggled up its side, propelled as much by fear as by willpower. Then, quite suddenly, his rotund shape plopped into the cone's aperture, leaving the raging winds to swirl a fresh handful of the elements into a dervish in the streaked atmosphere.

Polimander tumbled momentarily, then caught himself aright. He lowered himself gently in the quiet blackness. The moan of the wind retreated as he descended. With his descent Polimander gathered around himself a shell of mental equilibrium. He bathed himself in melliferous vibrations and allowed his consciousness to drop to the

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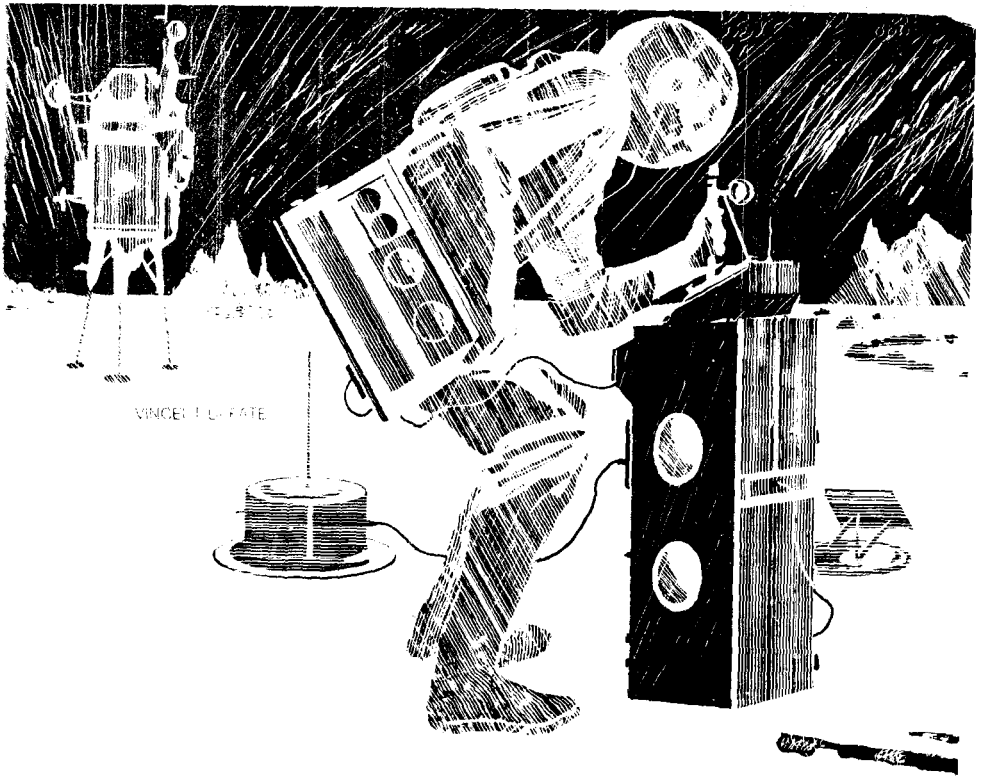
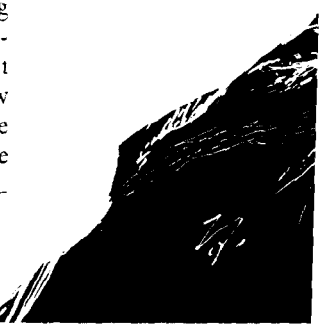


edge of sensibility. There he rested even after his furry posterior bumped the well's floor: he hung a few inches off the floor, spherical, unconscious for a time, allowing his body to readjust itself after the ordeal of passage.

"So many risings and settings. . ." Polimander was thinking as he drew himself back into consciousness, "since I have been out . . . since I made myself a new nest after our mating. . ." He shuddered, enlarged the membrane



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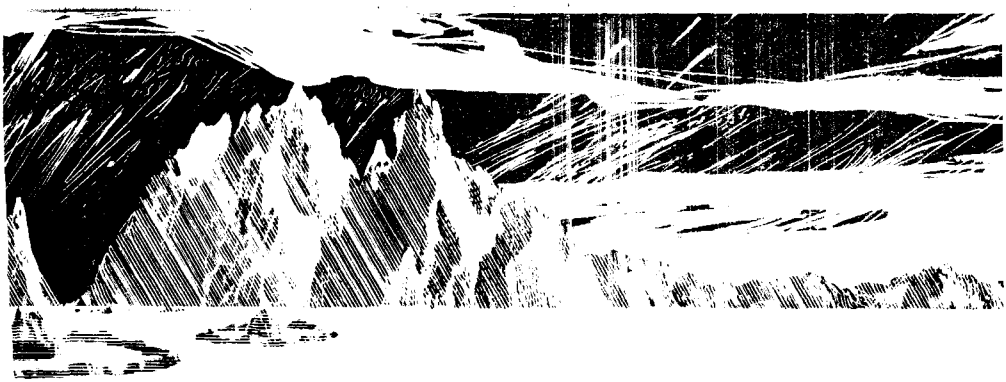

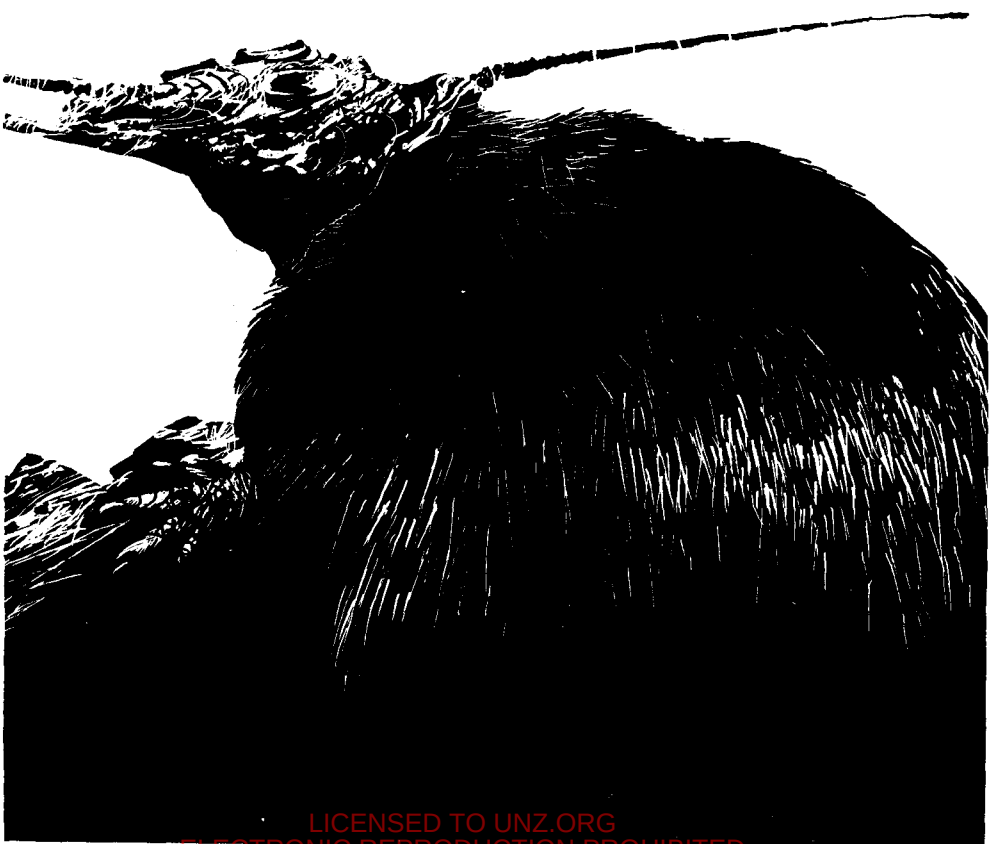

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of his "eyes" to gauge the heat around him. In this way he "saw" the shape and size and inertial intent of his environment.

He was in a tunnel, roughly cylindrical in shape, carved into the inert elements of his planet's surface. The delta land above him was frozen: the sand, which the wind blew about incessantly, was composed partially of this material compounded with powdered emerald silicon. There was no light there, but the heat and radio waves produced by the planet's dark sun grudgingly allowed some life to survive beneath the single huge planet's surface. This is how Polimander "saw" with the huge dish-shaped depression in his cranium, using the antenna at its rim to focus incoming radio waves to a locus.

Long before Polimander reached the nest he was in communication with its occupant.

"Polimander?" a faint mind-voice asked.

"It is I, Meyonae," Polimander answered.

"Through the elements?" The note of surprise was sharp.

"I come to see the infant." The heat sensations were much stronger now. Polimander moved down another pipeline which had punctured the first. Many openings appeared along the way. But his pattern through the maze was unerring.

"I grieve, Polimander . . ."

"I know, Meyonae. I come to see your grief."

A startling, low-pitched moan-thought came from Meyonae. Polimander trembled with impatient misery, and moved faster toward the source of the cry.

"I grieve," Meyonae repeated, the communication a direct result of some inner pain.

The passageway in which Polimander traveled ended abruptly at a spherical repository: it was as though he had been moving through the tube of a thermometer and had suddenly entered the bulb at its end. This was the nest. Meyonae hovered near the center. Other Unity members were in attendance, their minds concentrated on Meyonae's nest while their silent bodies lay back along the passageways, in nests of their own.

Polimander brought himself to a stop near Meyonae. Momentarily he touched her outstretched mandible with his own. About her fingers was an alien coldness which augmented the despair her thoughts relayed. She dampened her anguish now, so as not to inundate Polimander with her grief. This was the custom.

Polimander left her touch and turned to look down at the infant, silent, but alive. It was, as yet, unwound from the curled position of birth.

Polimander mentally searched, prowled, ransacked the currents which filled the nest. He pawed mentally over each vibration. All

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the other Unity members held in their consciousness as Polimander searched out the unique, distinct vibrations which should have come from the infant.

There was no infantile response. Yet it lived: Polimander could sense the churning organs, the rush of bodily fluids present in his little one. But there was absolutely no mental emission, no Unity.

Sadly, he dropped his sensitive probing down to the level of mutual consciousness where the other members hovered.

"So," he concurred, adding his thought to the assembled minds, "it is true."

Meyonae covered her bald head with a paw, drew herself into a ball and stilled her consciousness, withdrawing from the gestalt. She hung over the infant in intimate, deeply personal meditation. No one tried to pursue her mind, nor attempted to penetrate her anguished shell. The members concentrated, instead, on Polimander.

"Four solar transversals have passed," he said, "since the last birthing. Some of us witnessed this event. It was from this very nest. . ." He swiveled his directed wave of thought toward the youngest Unity member, his own first nestling by Meyonae–Tansemander, who already occupied his own nest. Tansemander acknowledged his sire's mental arrow with pride, unconcealed beneath the mantle of sorrow.

"Instead of a day of gladness at a new birthing," continued Polimander, "we have anguished silence. Instead of the addition of a new unit to the Unity, we have a crippled infant who will never be capable of knowing the Unity of his people. This little one will forever be alone, little more than a rock or a wind or a mountaintop. We must never cease to try and illuminate him: but we must be humbled by the fact that we may never be able to accomplish his illumination."

"Have any of the Unity been thusly afflicted before?" Tansemander asked.

"I have never heard of such a thing before." Polimander respectfully directed his thoughts to the disembodied form of the Old One in a sealed nest far away. There was no response, and none was expected: this was a formal gesture to the last member of the Unity who had gone into final sleep. "If the Old One were awake, he might have knowledge that could reach further back than mine."

Polimander rolled away his consciousness. He raised his concentration past the level of the majority and sought a single consciousness from the Unity.

"Pacea, old friend . . ." A mental touching of mandibles. Polimander hung over his sireling.

"Polimander, why did you go into the elements? Why did you leave the nest?"

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"There was something I had to do, Pacea. The thoughts I have just expressed . . . about illuminating the infant. I was sincere. How can I enter the final sleep until my nestling is brought into the Unity?"

"It is an accident of nature."

"I believe I have an answer. But first, I must ask, Pacea, since you are the Understander among us. You know the functions of our individual bodies. You have studied the secretions, the fluids, the rumblings, and the occasional sicknesses of these bodies. What makes my sireling a cripple? Does he lack an organ? Does he contain poison fluids? Most important, is the little one in pain, such pain that it would require euthanasia?"

"I don't know why the nestling is silent, Polimander." There was great sadness behind the thought.

"And is it suffering pain which it cannot express?"

"I don't think so. Its body is at peace, there is no contortion, none of the obvious bodily evidences of internal pain. The infant is simply lacking the sense of Unity. Of course, I could only listen to the bodily functions. I cannot hear *him,* as I could a normal member, if there was distress. It is the strangest thing I have ever encountered."

"I wanted to establish these things before I do what I have come to do. Before I came I did much thinking on the condition of the infant."

"And . . .?"

"Its silence is remarkably like the silence of the menfolk who have been digging in the surface for these few risings and settings. . ."

Pacea drew back.

"I know you consider the menfolk irrelevant. But ever since their appearance I have considered their function. We have not been able to communicate with them, yet they are sentient."

"What have they to do with the defective infant?"

"Pacea, menfolk build sleds and use devices to achieve a kind of artificial Unity. Last rising I perceived them transporting one of their number, one who had been crushed beneath a rockslide, on a transportation device." Polimander relayed a frozen impression of the scene of the menfolk to Pacea.

"Don't you see, Pacea? Long after I witnessed this, from the solitude of my nest, I have tried to think of the implications of their actions. But it was not until the birthing of Meyonae's defective infant that I really considered what the menfolk had done."

"But the little one has not been crushed. It is perfect, except for the lack of Unity."

"That is the crux of my considerations. The menfolk do not perceive as we do. They take a different part of the spectrum and sense this. They do not sense in natural Unity."

"But how can a single organism

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function without attachment to its Unity? Polimander, your grief has made you irrational."

"Let me finish. They use devices made from metal, little wave-sleds to transmit thoughts. With a flexible organ on the front of their heads they put thoughts into sound patterns. Then they transmit these patterns through the little devices. I not only perceived the function of the devices, I projected my mind into one to understand how it works."

"And?"

"And I have recreated such a device, attuned not to the menfolk's strange communication, but to our Unity. That's why I had to come to the infant. I am going to attach the device."

"Polimander, this is against the ways of our people. We have never had to create artificial devices for ourselves. We contain all within our bodies and our Unity."

"Exactly. None of us has ever been deficient in Unity before. If we had, one of our number would have tried, at least, to create artificial Unity in some way. Now there is a need, and only luck brought this need with the coincidence of the arrival of the menfolk. I made the device from parts of their devices. The trips to the surface were terrible: once I didn't think I could get back to the nest. Another time one of the menfolk saw me and hurled a rock at me. I am greatly weakened, but I knew I must try out the device on the infant, to see if it works."

Polimander drew something from his anal pouch. It was smaller than his little hands, tangled with foreign materials. It bore no shape in relation to the fur-rock-darkness world of Polimander's people. Polimander moved to the silent ball of fur which was his and Meyonae's nestling. A surge of hope filled him, touched with panic unusual in his ancient people. He only hoped that he had been precise enough, that his extrapolation of the menfolk's device was correct.

Gently, with his clumsy fingers, he attached the device to the bald cranium of his sireling, using pilfered straps and pilfered scraps, stolen tinkerings, wire, screws, and a discarded rheostat which he had taken from the menfolk's tool boxes.

Now, all the Unity's attention was on Polimander and the infant. From distant nests, a hundred minds welled into focus on that spot. Polimander and his infant were the hub of an ancient wheel: the separate minds were the spokes linking the individuals in Unity.

The infant did not move. Polimander was an open receiver, waiting, poised like a mental sponge to catch the slightest vibration.

And it came. The confused, whining, infantile babble crowded into the Unity of the nest.

The infant cried. ■

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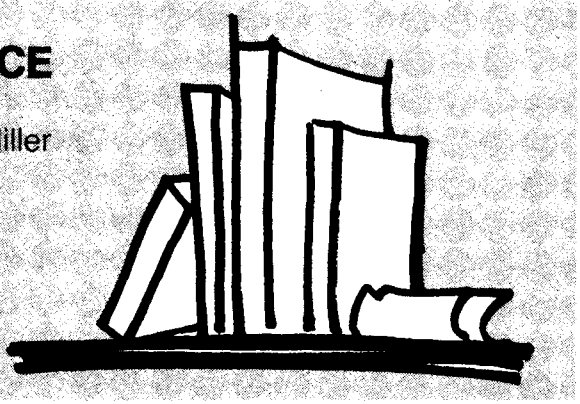

AGAIN . . .

Painters who launch a new school of art may never sell a painting in their lives. Great musicians may never hear their compositions played in public. But writers—at any rate, writers of fiction—need to be published. They need an audience. And Harlan Ellison's massive series of "Dangerous Visions" anthologies is providing a very effective outlet for new, experimental stories of what had better be called "speculative fiction."

The original, 1967 "Dangerous Visions" anthology contained thirty-three new stories, two of which won Nebula awards, two "Hugo" awards (one took both), while the book itself got a special plaque as "the most significant and controversial SF book" of 1967. "Again, Dangerous Visions" (Doubleday & Co.; 760 pp.; $12.95) has forty-six original stories by forty-three authors, plus a rich store of Ellisonian comments and repartee (as much a part of an Ellison book as the stories) and some remarks by the writers. We are told that there is a third volume to come, and it may be even more gigantic than the first two.

I don't think the book is the blockbuster that "Dangerous Visions" was. In part that is because it has to be measured against its predecessor; in greater part because the SF field has changed a lot since 1967, with experimental writing, "relevant" themes, four-letter words, vigorous and sometimes experimental sex, now relatively common in paperbacks, if not in "family" magazines. It's a truism among walkers-up-mountains (and I suspect among true mountaineers) that you get the most impressive views from part-way up to the peak.

I can't possibly, in the space at hand this month or over two or three months, say very much about forty-six stories—quite a few of them novelettes or novellas—not even omitting the fantasies and purely experimental stuff with no

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real *science* fiction content. What I will do is talk about the dozen or so that impressed me most. The order in which I list the stories hasn't very much to do with my order of preference: in an anthology as varied as this, there are enough different kinds of stories to make up several books with different themes.

Harlan says his own favorite is Richard Lupoff's 36,000-word novella, "With the Bentfin Boomer Boys on Little Old New Alabama." This is a real *tour-de-force* which keeps three balls in the air at once in much the same way Isaac Asimov did in "The Gods Themselves," but more trickily. It is the story of interplanetary war between the Southern-descended white supremacists of New Alabama ("Killanigra once a day. Gyrene has to earn his pay."), the relatively well educated but bureaucratically constipated "papadocs" of New Haiti (who reinvent zombies to fight their wars), and the fantastic adapted S'tschai of the seaworld, N'Yu-Atlanchi (who are implanted in cobbled corpses to activate the zombies). The N'Alabama episodes are cruel satire, told in a dialect that is not as successful as the invented jargon of "Clockwork Orange" but is cumulatively telling. The N'Haiti bits are subtler, but just as telling. Only the folk of N'Yu-Atlanchi are wholly sympathetic.

I think my choice is Ursula Le Guin's equally long "The Word for World is Forest"—one of her fascinating far-world constructions which create and dissect a world, an ecology, a society, and all their components. Men have been like this in Earth colonies, and they will be like this in planetary colonies, especially when they have a manifestly inferior subrace like the "creechies" at their disposal. It is a story of how creatures become "human" and how humans become inhuman. You'll remember it.

You'll also remember a pair of stories by the prestige author of the book, Bernard Wolfe, whose "Limbo" was an unintended dark-horse classic of years ago. (Rumor is that he wrote it as a parody of science fiction.) Only one of the pair, "The Girl with Rapid Eye Movements," is science fiction; it tells of a girl and a man, participating in a college sleep experiment, whose dreams become more and more alike until they are telepathically united. "The Bisquit Position," the second story, probes and jabs into tender places in our own intellectual circles—psychological SF, if you like, but as "straight" a story as you'd find anywhere. They are also probably the best writing in the book. Read them and see what mainline-with-content means.

Lee Hoffman's "Soundless Evening" and Piers Anthony's "In the Barn" should be read together and are printed together. They are cruel satires in the manner of Swift and his Yahoos. In the Hoffman future, surplus children are kept like pets—tiger cubs, perhaps—and disposed of when they grow too large to be convenient. In Anthony's alternate Earth, surplus adults are bred and conditioned as farm animals. His agent-of-Earth finds himself a farmhand in a stable where women

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are kept as milk producers, to be tended and serviced like cows. Today being today, he exploits the traditional farmhand's privileges.

Veteran readers may remember Ross Rocklynne's science problem stories in the old, old Astounding Science Fiction. He reappears with "Ching Witch!", a fascinating tale that evokes Haight-Ashbury of 1966 (when it was written), extrapolates it to world jet-set, transports it to a far planet, and sets an opportunist on his can.

Edward Bryant, quite new, suggests what the television industry may someday have to do to hold ratings for its newscasts. "The 10:00 Report Is Brought to You By . . ." newscasters who invisibly prowl the countryside, looking for rape, murder—any violence that will make the watchers' eyes shine. When will the evening newscast be as contrived as TV wrestling?

Kate Wilhelm certainly is no novice, but "The Funeral" is very much in the new mode. Can you see today's schools in the educational conditioning boxes of her future? Joanna Russ is another feminine writer who accepts and needs no favors from the males. "When It Changed" shows us a future on a planet where women have made men unnecessary. Josephine Saxton pours salt on male pride with "Elouise and the Doctors," which projects our protection and preservation of the lame, the halt and the diseased into a future where a healthy girl is an enemy.

I certainly mustn't end this without giving Ben Bova a star for one of the book's few, and good, "hard" science stories, "Zero Gee." In a way, it is an even straighter story than Wolfe's "Bisquit Position"—a near documentary about a spaceman in an orbital lab with two women, one a glamor girl whom he has promised to ball in free fall. But that's not really what the story is about . . .

Burt K. Filer is new to me. His "Eye of the Beholder" weaves a fascinating picture of art as mathematics—or mathematics as art. If calculation can improve on creation, what is an artist's purpose?

Dean Koontz delves into dark corners of the McLuhan world in "A Mouse in the Walls of the Global Village." Like the Saxton story, it's a variant on Wells' "Country of the Blind," when empathic circuits have made most people telepathic—one huge, happy family: those for whom the circuits don't work are freaks and perverts.

Thomas M. Disch's "Things Lost" takes us into space with a shipload of intellectual elite—a crew of Renaissance men and women, multitalented, bound for the stars, with their only common trait their utter self-centeredness.

This is a third of the book—I think the best third, but only a third. You have a not very good poem by Ray Bradbury (I am poem-deaf). You have an indescribably blob-story by Gahan Wilson. You have Kurt Vonnegut . . . James Blish . . . James Tiptree . . . Terry Carr . . . James Sallis . . . and many, many more.

The only way you'll really learn about this book is to read it. Which has been Harlan's idea all along.

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THE GOLD AT THE STARBOW'S END

by Frederik Pohl • Ballantine Books, New York • No. 02775 • 215 pp. • $1.25

Frederik Pohl has had about as varied and effective a career in science fiction—author, editor, lecturer—as anyone in the field, and he is still writing good SF. The title story, one of five in this new collection, was published here in Analog last year; the others are all from 1970 and 1972.

You may recall "Starbow's End" as the story of a cynical experiment in forced evolution, in which a crew of talented men and women is sent off to a hypothetical planet of Alpha Centauri, which doesn't really exist. The whole project has been set up to create an atmosphere of intellectual interplay, which its originator hopes will produce marvels of invention and discovery. It does—not quite convincingly—as they all become supermen (or should I say superpersons?). Fred Pohl considers this his best recent story. I prefer the one that closes the book, "The Merchants of Venus."

This is Pohl playing Heinlein, in the style and mood of one of his Moon stories, and doing it very successfully. It may be the hardest "hard science" story the author has written. Its setting is the "new" Venus—the horribly hostile, corrosive and arid world revealed by the Russian probes and by our own. Its theme is really the fragile economic existence of the Venus merchants, living off the various status-levels of tourists who can afford the interplanetary trip. One of them, Audee Wathers, is a professional guide who takes the visitors to look for treasure in the abandoned tunnels an ancient nonhuman race has left under the planet's surface. His last millionaire, unfortunately, is a deadbeat.

Of the three shorter stories, "Call Me Million" is a fantasy about a soul-eater. Don't let that put you off. "Shaffery Among the Immortals" is a black comedy about a thoroughly modern antihero type—a *nebbish* of a loser who wants his name to go down in history, and succeeds in a most unhappy way. The least of them, "Sad Solarian Screenwriter Sam," is a rather old-fashioned yarn with an old-fashioned gimmick: the galactic watchers pick one man whose actions will decide whether Mankind—indeed the entire Solar System—will be destroyed. The man is a familiar show-business type, an opportunist who is a little too slipshod to be successful, and so we are obviously doomed. But there's a snapper at the end.

Good Pohl. Good SF. Maybe the SF Book Club will print a hardback edition some day.

THE STEPFORD WIVES

by Ira Levin • Random House, New York • 1972 • 145 pp. • $4.95

You didn't read about "Rosemary's Baby" here, because Analog doesn't concern itself with fantasy, but you can hardly have missed Ira Levin's low-key, realistic story of devil-worship in present-day New York. You did see a report on "This Perfect Day," which was le-

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gitimate science fiction with a strange future society of plausible contradictions. This little book—not much more than a novella—is another underplayed, realistic story of something strange taking place in a Connecticut "bedroom" community.

Joanna Eberhart is a thoroughly modern professional woman, a successful photographer, with two children, a good husband, and a more than active interest in women's lib. She finds the women of Stepford a bit peculiar, and they grow more so.

They are the perfect suburban wives with no interests outside their homes and families—yet the local papers say that at one time Stepford had a very vigorous and civic-minded Women's Club. She does find one or two kindred souls—but they change, almost overnight, into perfect Stepford wives.

Joanna, of course, sets out to probe. What really goes on behind the high fence and locked gate of the Men's Club, where the Stepford men spend most of their nights? Is it more than coincidental that Stepford has become an enclave of computer experts, microcircuitry designers, systems engineers, optical sensor developers . . . and one of the men who helped Disney build his walking, talking animated figures?

The question, in short, is not who—but *what*—are the Stepford wives? You'll know, almost from the beginning, but it's creepy fun watching Joanna find out. The uninitiated will have the added pleasure of surprise.

SF BIBLIOGRAPHIES

by Robert E. Briney & Edward Wood • Advent: Publishers, P.O. Box 9228, Chicago, Illinois 60690 • x + 49 pp. • $1.95

Advent, one of the oldest of the still-active fannish publishers of books *about* science fiction and fantasy (Rhode Island's Donald Grant and Los Angeles' William Crawford have probably been at it longer, but are primarily fiction publishers), has another "must" reference book here.

The book, nicely printed and neatly paperbound with a handy list of all the Advent books-in-print on the back, is an annotated list of bibliographies on science fiction and fantasy. It is divided in four parts: magazine checklists and indexes; bibliographies of individual authors; general studies with useful book lists; and a few foreign-language works. There is also a functional index; I don't know Briney, but anything Ed Wood does is functional.

The compilers are mainly American, English and Australian. Most of them are active fans. I have been appalled to find how many really major works I had never even heard of, let alone seen and reported here. Some of the best have been circulated without charge to members of amateur press and SF fan organizations, through fanzines or special publications, and have never been for sale. The best place to find copies today is in the "hucksters room" at one of the big national or regional conventions. Next one I attend, I'll take this little book along.

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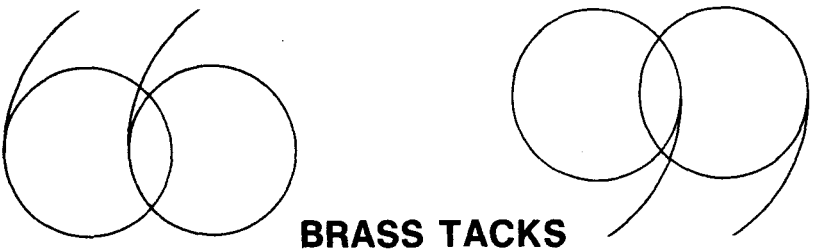

BRASS TACKS

Dear Ben:

Regarding the Personality Profile of Buckminster Fuller in the September 1972 issue . . . Norman Spinrad really brought it together! An excellent, sensitive treatment of one of the intellectual greats of our era. A fitting substitute for the editorial.

Every man a Comprehensivist? Certainly! New management techniques demand it. The cross-fertilization of professional and technical disciplines can't exist without it. The "universal eye" of TV and the mass media generate it in our young (at the sixth-to-eighth-grade level!).

But no Specialists? Never! Individual thought and application on a broader base, certainly. (The disruption of technology due to the political mishandling of space exploration programs has taught thousands of scientists, engineers and technicians a lesson they won't soon forget!) . . .

JIM PHILLIPS
c/o Jim Hartman & Associates, Inc.
3000 Biscayne Boulevard
Suite 303
Miami, Florida 33137

The era we call "the Renaissance" seemed like the end of civilization to many "organization" men of the Middle Ages. Are we now entering a New Renaissance?

Dear Mr. Bova:

Regarding the September 1972 issue:

First, the Personality Profile on Buckminster Fuller was fascinating—more books could probably be written *about* that man than he has written himself. But I hope the feature won't entirely replace your own editorial every month. I think that some of the negative letters on your prison editorial are symptomatic of a general attitude regarding criminals that has resurfaced in the face of a rising crime rate. (Have you noticed the plethora of anti-crime paperbacks on the stands—the "Executioner" series, "Destroyer," et cetera? Just like the pulps of the '30's and '40's.)

Second, Gerald L. Hewett's letter, while raising some interesting points about fiction, makes some frightening statements about professional crooks making good heads of government. From what I've seen, locally and nationally, they're not as concerned about protecting the property of the city (or country) as they are with tapping public finances and facilities for their own gain. And the overhanging threat

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of medieval prisons is a poor substitute for a well-developed superego . . .

GARY ALAN RUSE
Creative Media
2131 S.W. 62nd Avenue
Miami, Florida 33155
The editorials will continue, with occasional breaks for guest editorials and personality profiles.

Dear Mr. Bova:

I am afraid you get only a C+ for your new feature, Personality Profile (September 1972 issue). Your big problem was trying to decide just who was being profiled: Buckminster Fuller or Norman Spinrad. Especially during the discussion about the Chinese language, Mr. Spinrad was so intent on explaining a "long-term crank notion" of his own that Mr. Fuller could hardly get a word in edgewise! This brings me to the subject of this letter.

Mr. Spinrad believes that the "root basis of any given culture is the basic linguistic viewpoint of its language, which both reflects and molds the world view of the people *speaking* it." (Emphasis mine.) He then draws all sorts of conclusions based on how Chinese is written, not on how it is spoken. Whatever merit his argument has, he has failed to show any connection between how a language is written and how the people who write that language are influenced by it in their thinking. If the Chinese think a certain way because of their language, it must be so because their language is tonal and disyllabic, with little grammar, no inflection, and emphasis on word order to express meaning. The way they write that language is beside the point. It must be this way, otherwise we must conclude that an illiterate Chinese undergoes some radical transformation when he learns how to read and write. Chinese can be written in an alphabetic script: the government is actively promoting its use. English can be written in Hebrew characters, too. Do the peoples of India and West Pakistan think differently because in India they use an Indian script to write a language they call Hindi and the Pakistanis use an Arabic script to write the language they call Urdu? It is really the same language: Hindustani. There can be no necessary connection between the way people think and the way that culture records thoughts (writes) because thinking starts in childhood before writing is learned and in fact is a prerequisite to learning to read and write . . .

GEORGE A. GAUTHIER
111-34-5055
HQ 31st USAAD
APO NY 09221
But a child's thinking—even his input perception of the world around him—is heavily influenced by his training in infancy. That's where cultural factors make their first, biggest, and most important impact on the way we think.

Dear Mr. Bova:

I wish to make some points on a few of the many errors in the "quicky" economic history of the world contained in September's Personality Profile, "Buckminster

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Fuller: The Synergetic Man."

The first is the notion of a "takeoff point" for industrialization, after which progress is automatic. The only way one could fall for such a fallacy is to never ask, "What is the cause of progress?"

It must truly take an inconceivable amount of effort to evade the fact that progress is proportional to individual freedom.

This simple observation upholds (or is upheld by, depending on your epistemological method) the basic capitalist economics and individualist philosophy. (See Ludwig von Mises and Ayn Rand.)

Fuller's idea of such a nonsensical "twenty-five-year takeoff period" is even more ridiculous in the face of Russia's fifty years of failure. (See "Workers' Paradise Lost" by Eugene Lyons, a fifty-year evaluation of Russia.)

Another point I wish to bring up is the idea that a gold standard economy is "based on the false notion that production had to be limited by the amount of gold necessary to finance it."

The false notion is on Fuller's part in his misunderstanding of the market system. The *amount* of gold available is irrelevant because the market value of gold determines how much in *real goods* a unit of gold is worth. It is the amount of these goods (capital) you can raise which *does* limit production. You cannot increase production if you do not have the capital goods (land, factory, machinery, raw materials, money for wages and patents, et cetera). But the amount of gold in the world could double or halve (including yours of course) and you would be in no better or worse position, for the amount of goods or labor you could buy would double or halve respectively.

GUY C. GORDON

Coe College
Cedar Rapids, Iowa 52402

Evidently the Russians haven't read Rand or Lyons. Their GNP is growing faster than ours, their missiles are bigger and more numerous, and their submarines are off our coasts. That's failure?

Dear Mr. Bova:

I feel impelled to write you and congratulate you for your perspicacity in publishing Norman Spinrad's bio bit on Buckminster Fuller. It is absolutely superb and far far above anything yet done on the man in the media—from *The New Yorker* right down to the *Time* cover piece not too long ago.

Spinrad is full of surprises. His analysis of Fuller's omni-verbal prose poem (out as "Intuition") is excellent. His own aside regarding Chinese ideograms is right on. Chinese ideograms are to linear alphabetical words what algebra is to straight arithmetic . . .

This is worthy of wide dissemination. Hope it gets it.

WILLIAM SAMBROT

1839 Oak Street
Napa, California 94558

Spinrad—and Fuller—have evoked strong reactions, pro and con.

Dear Mr. Bova:

The "New Wave Mob," says reader Hewett (September 1972 issue). Wow, an interesting image is

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suggested! These writers are occupying the offices of Condé Nast, filling the air with noxious marijuana smoke, and, perhaps looking and smelling the part, reminding one of the proverbial monkeys picking away randomly at their typewriter keys. They desire to become Shakespeares. Ultimately, they force their work upon Editor Bova.

Hewett's claim that they have no human contacts is, he says, "easily demonstrated." Well, I was at Noreascon last September and met one of the indicated, he seeming quite friendly and even appearing to have a personality.

Also when I was at the convention I bought two old issues of Analog, August and September 1942: issues exactly thirty years old. They were filled with stories Analog readers may have heard of: "The Link," "The Barrier," "Waldo," "Nerves," and "The Twonky."

Analog, September 1972, doesn't exactly measure up. Schmitz offers routine space adventure, Anvil salve for American pride injured by the Vietnam War, Strausbaugh boredom, and Conley sophomoric humor. Clancy O'Brien's short story is only noteworthy for its compression in a very few pages of all the anti-hippy clichés extant.

Nevertheless, I found the issue worthwhile. L. Sprague de Camp's piece provides an interesting glimpse of technology and culture. Norman Spinrad's profile of Buckminster Fuller is an engrossing look at a man with solid achievements and challenging ideas. Note that de Camp was one of the best SF writers of the '40's and '50's and Spinrad is one of the most controversial figures of the so-called "New Wave" . . .

Science fiction admittedly has changed and so has the general attitude toward science. We all realize how much science has done to improve man's lot. But technology, implemented science, has helped to create a world of superdestructive weapons and deadly pollution. "New Wave" writers express great urgency at man's present predicament, but hardly ever nihilism. Read, for example, Brian W. Aldiss' nonfiction book, "The Shape of Further Things," or one of his stories, like "The Soft Predicament." How much I would like to see an Analog in which a Brian Aldiss story could appear, or a Samuel Delany story. R. A. Lafferty could provide true humor, not just a string of schoolboy gags. And, of course, the hardnosed science articles would be kept. With a combination like this Analog would be a splendid magazine. Something unique and perhaps, to use a term of Buckminster Fuller, synergistic.

ROBERT WERNER
R. D. 2, Box 164 E
Greenville, New York 12083

It has always been the Editor's policy to consider each story submitted to Analog on its individual merits. The emphasis in this magazine is on SCIENCE fiction, which some writers can produce and some can't. It's the Editor's responsibility to make the choice. And the reader's responsibility to keep the Editor in line!

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EDITORIAL

continued from page 7

parties—and both Presidential candidates of 1972—have claimed to support the idea, at one time or another.

The idea is the negative income tax.

It works this way: The cognizant government agency (and government here can mean federal, state or local) sets a minimum guaranteed income, and a reduction rate. For example, the minimum guaranteed income might be $3,000 per year, and the reduction rate 50 percent. This means that for every $1,000 in income the person earns on his or her own, the welfare money will be reduced by $500. This provides an incentive for the person to earn an income—for the more income earned, the more money the person actually has in his or her hands. And the more money the person earns, the *less* the government has to dole out, as the table below shows.

Earned Income	*Guaranteed Income*	*Total Income*
$ 0	$3,000	$3,000
1,000	2,500	3,500
2,000	2,000	4,000
3,000	1,500	4,500
4,000	1,000	5,000
5,000	500	5,500
6,000	0	6,000

This negative income tax idea has been tried experimentally in five cities, in a program sponsored by the U.S. Office of Economic Opportunity. The cities were Scranton, Pennsylvania, and Paterson, Passaic, Jersey City and Trenton, New Jersey.

The most interesting feature of the experiment's results was that the people who received the negative income tax didn't simply sit back and live off their government guaranteed income. They went out and got jobs, at about the same rate as people who had no welfare money at all coming in. In other words, this welfare system shows evidence of encouraging people to get up and work, rather than forcing them to remain officially poverty-stricken.

Now then, what would happen if the negative income tax became a permanent feature of our welfare system?

First, it would remove the money-handling from the welfare administrators. The negative income tax could be handled by the same jovial people who take care of the *positive* income tax: your friendly and efficient Internal Revenue Service. The IRS is set up to handle such a system, is good at finding frauds and cheats, and has an impressive record of victories in its court actions. People would qualify for welfare not by showing up at a welfare office in rags and tears, but by filling out an IRS form—the same as thee and me—every April 15. The rate of cheat-

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ing might not go down, at first; but the rate of exposure and conviction of the cheaters will be impressive.

Second, when the nation's unwed mothers no longer have to storm welfare offices to demand extra checks for winter clothes, perhaps the social workers will finally get the time to do the work they were originally trained to do: counsel and advise the welfare recipient; find the reasons why a woman will go through life producing babies who will be raised without a father; get the children to school so that they might learn how to cope with their environment; provide the health and social care that so many of the poor and elderly desperately need.

Most important, the new system will throw the responsibility for the welfare recipient's financial status squarely onto the welfare recipient him- or herself. Instead of a paternal welfare office doling out checks for this and that, providing you prove you need it, there will be a regular income from the government with no strings attached to it. And that's all. If the money gets spent on booze, it will be spent *and there will be no more.* The only additional money available to the welfare recipient will be what he or she earns.

The basic purpose of any welfare system should be to get people off the welfare roles and make them taxpayers, not tax burdens. The negative income tax might be a way to move the welfare class in that direction. Clearly, the welfare system that we have now is heading for disaster.

But what of the more distant future, when automation is complete, when fusion energy is cheap and abundant, when the economy is so incredibly rich that hardly anyone needs to work? Remember that, compared to the dawn-to-dusk labor of pre-industrial societies, we are now unbelievably wealthy and work very little. When the next quantum jump comes, from automated self-servicing machinery that can produce all the goods we want with hardly any human intervention, what happens to the Protestant Ethic?

The only possible kind of work for humans will be jobs that machines can't do: services that require personal relationships, artistic endeavors, handcrafts.

Will we develop an economy in which our machine-based wealth makes the very concept of the Work Ethic unthinkable? Eventually, perhaps. But think of the social lag that now exists between our Protestant Ethic and the realities of the welfare class. Now multiply it to encompass the majority of the human race: unemployed, unemployable, restless, with plenty of time on their hands to get into mischief.

Maybe *that's* why Cheops started those pyramids! THE EDITOR

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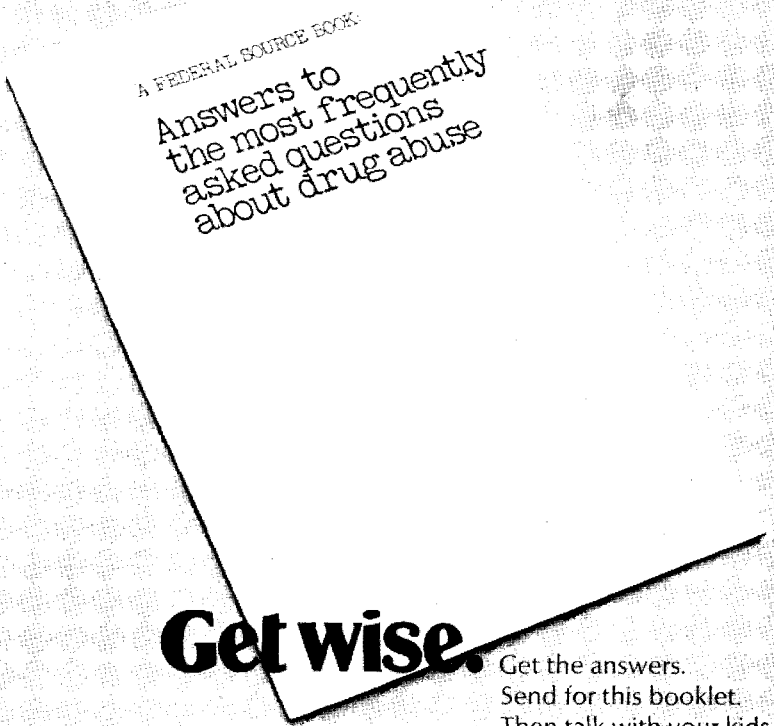
Your kid shouldn't know more about drugs than you do.



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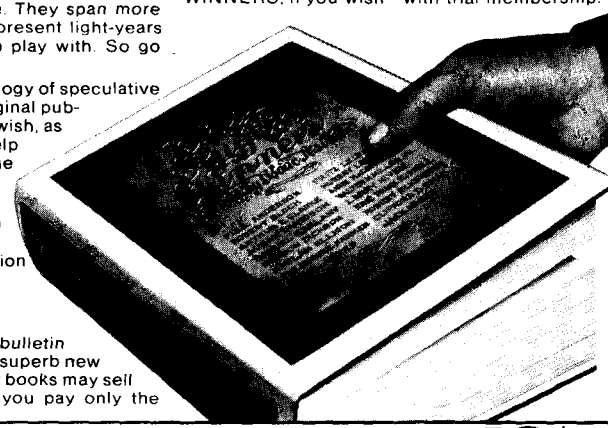

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